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Man and the Atmosphere.

Daniel Vaughan, of Hopkinsville, Ohio, who has the credit—if credit it can be called—of having advanced quite a number of new theories, adds another to those he has already presented, in the New York *Tribune* of the 4th inst. It is an exceedingly droll and erroneous one, but on that very account it may meet with many believers.

He has come to the conclusion that the ancient atmosphere contained a very large amount of oxygen, which was subsequently wasted in the course of geological changes, and states his researches prove that "a small diminution in the amount of oxygen composing the air, promotes the developement of the higher faculties and the finer feelings of the mind."

He then asserts that it was by the removal of oxygen from the ancient atmosphere that the earth was prepared for the introduction of man, that by the removal of a small portion of oxygen in rooms heated by fire places, mental vigor is increased, and study made less laborious and more successful. But funny enough, he asserts that in stoves fuel burns without materially altering the composition of the external air, and therefore does not confer any intellectual benefit. There can be no difference whatever in the composition of the atmosphere in so far as the oxygen is concerned, in apartments heated with stoves and fire places. He asserts that the atmosphere still continues to lose its oxygen, and if man's physical powers can stand it, his intellectual faculties will continually improve, and knowledge and benevolence reign over all parts of the earth. "Ignorance and barbarism," he says, prevail among tribes, who use no fuel to warm their apartments, hence civilization deserted so many lands when their forests were exhausted."

Upon this principle of theorizing the Indians of North America should have been the most civilized set of fellows in the world, for no other regions were so well provided with forests a century ago. It is all nonsense, however, about the removal of a portion of oxygen from the atmosphere improving the mental faculties. The ancient Greeks were men of as keen intellect as any of the moderns, and their philosophers used to study in the open air. Rousseau made a habit also of studying out of doors; Scott composed much in the open air; and so have some of the greatest writers of modern times.

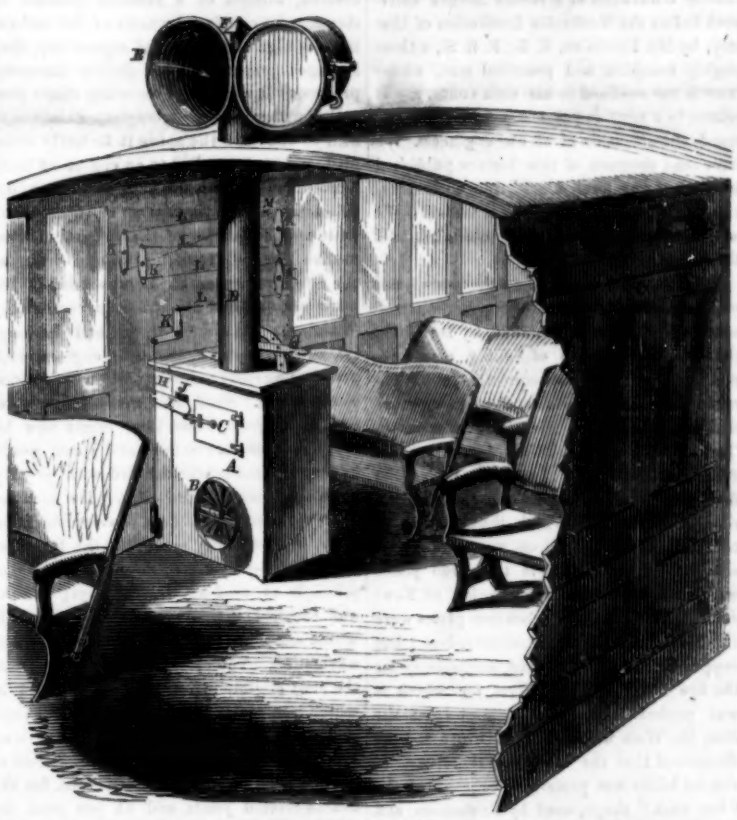
The San Jacinto.

This steamer has grown to be a wonderful sailer, it seems. It made a recent run from Philadelphia to Havana in six days. Another new screw did this, it is stated.—This is at least the third screw this frigate has had put in. We are glad to see that it is improving.

Machine Boots and Shoes.

We have been informed that one of the large factories of Benj. Marshall, Esq., Ida Hill, Troy, N. Y., is about to be fitted up with machinery for manufacturing boots and shoes. The machines will be driven by water power.

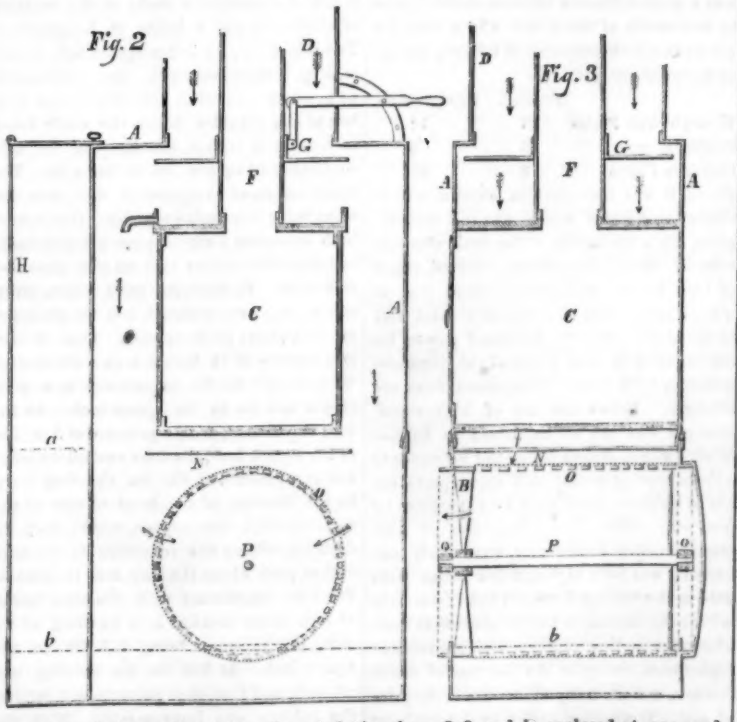
VENTILATING RAILROAD CARS.



The accompanying engravings represent a method of ventilating railroad cars, for which a patent was granted to B. T. Babbitt, of this city, on the 30th of January last.

Figure 1 is a perspective view of the ventilator applied to a car; fig. 2 is a vertical section of the apparatus, and fig. 3 is a vertical transverse section of fig. 2. Similar letters refer to like parts.

A is the outside shell containing a stove, C, inside of it. F is the smoke pipe of this stove, passing out at the roof of the car.—Another cylinder or tube, D, encircles the smoke pipe. This tube has a trumpet mouthed cap, E, secured to each side of it, each having a lid. This cap is opened to catch the air, as now shown in fig. 1; but when the car is moving in a contrary direction it is closed, and the mouth of the other cap opened. As the car is moving forward the



trumpet-mouthed cap, E, catches the wind, which is compressed and driven down the outside tube, D, as shown by the arrows, figures 2 and 3, then passes around the stove, C, taking up heat in its progress, and then forces itself through the meshes of a wire gauze cylinder, B, making it rotate on its axis, P. This wire gauze cylinder rotates in bearings, Q Q, and is enclosed at one end, but open at the other. It rotates in a tank of water, shown by the dotted line, *b*. The wire gauze, O, catches the particles of smoke and dust, and as the cylinder revolves these are washed off, and fall to the bottom of the tank. A clean moist surface of the wire gauze is therefore always exposed to the air as it comes into this cylinder, so as to screen it of all dust and smoke. It then passes out—as shown by the arrow, fig. 3, into the car. The air of course will only require to be heated during cold weather, so that the stove will not be required when the atmosphere is of a high temperature, but the apparatus, being constructed with a stove, is adapted for use during all kinds of weather. The chamber, H, fig. 2, is a cistern of water to supply the tank in the wire cylinder chamber. The water is kept at a proper level by a hollow ball float on its surface, *b*, which operates a faucet to admit water to the screen wheel as required.

G is a tubular valve or collar, with bottom flanges on it, and is secured around the smoke pipe, F. By pressing on the lever handle, fig. 1, it can be elevated and lowered, so as to contract the passage through which the air passes down into the wire gauze cylinder. It therefore regulates the quantity of air which is admitted into the car. N is a plate of copper, which prevents moisture being thrown against the bottom of stove, C.

In figure 1, L L represent steel wires attached to vibrating fingers, K K, and secured to a terminating bell crank, K, connected by a wire, H, with a sliding damper, I, which covers and uncovers the opening, J, of the stove, to supply or shut off the air, and regulate the combustion in the stove by the temperature of the atmosphere in the car. By the expansion of the steel wire, L, by a high temperature, the damper, I, is made to close the opening, J, and *vice versa*.

In the manner described and represented, it is designed to purify and to regulate the temperature and quantity of air in railroad cars.

More information may be obtained by letter addressed to Mr. Babbitt, No. 68 and 70, Washington street, this city.

Planting Potatoes.

We hope our farmers will take great pains in selecting their seed potatoes this year. No farmer should plant seed potatoes grown within five miles of his residence. Those living in the interior of the country should get their seed from near the sea board, and vice versa. A successful cultivator of potatoes informed us, that it was his practice to get his seed potatoes every year from a distant part of the country, and which had been grown upon soil somewhat different from that of his farm. Seed potatoes should be well dried before planting. A Russian professor has asserted that potatoes grown from seed dried at a heat of 230° will never be affected with rot. It becomes our farmers this year to pay great attention to the cultivation of potatoes, so that we shall not be compelled hereafter—as has been done for two years—to import so many of them from distant countries. We believe it would be a good plan to dust over the potato vines with the powder of air-slacked lime just before they blossom. This would destroy bugs and not injure the vines.

Improved Cotton Gin.

The Coffeeville (Miss.) *Herald* speaks highly of an improved cotton gin by H. H. Futtz, a planter of that district.

The editor of the *Herald* has been shown letters from experienced cotton buyers, stating that the sample produced by this gin, owing to the improvement in the staple, and the cleansing process which it undergoes, will command from 1½ to 2 cents per pound more than the article prepared by the gins ordinarily in use. In addition, there is an increased saving in the quantity of cotton ginned of about one pound in every thirty.

The Art of Dyeing.—No. 20.

BUFF COLOR ON COTTON—This is a binary color composed of the yellow and red rays, the former predominating; it is, therefore a yellow tinged with red; but the dark buff of commerce is not a binary, for it is composed of the three rays, yellow, red, and blue. There is great confusion of names in works on dyeing—fashionable names they might be called—such as "fancy bloom," &c., which have nothing to do with an understanding of the nature of colors.

NITRATE OF IRON BUFF—The buff of curtains employed for windows is a fast color, and stands exposure to the sun and air, and is capable of being washed with soap. It is generally dyed with a salt of iron, the nitrate being the one commonly employed. The goods being bleached and well washed, are first run through a tub containing a solution of the nitrate of iron, about 1°, and handled smartly for ten minutes. They are then taken out, aired, and run through a tub of clean lime water, after which if they are not dark enough, they get another dip in the iron liquor, another in the lime water, then run through a strong solution of soap suds, washed and dried.

The nitrate of iron is prepared by dissolving clean iron hoops in nitric acid. The acid should be fresh, and the iron fed in slowly. Some care is necessary to do this. The vessel in which it is killed, as the operation is called, should be of stone ware, and not filled above half full of acid, as it is liable to boil over. The iron should be added as long as the acid boils, and should be carefully watched, so as not to feed in any longer, or the contents of the vessel will become pasty, a conclusion which should always be guarded against. The nitric acid dissolves iron rapidly, and a thick orange smoke passes off, which is the binoxyd of nitrogen, very dangerous to inhale. By repeated dips, as described, any depth of shade may be given to cotton goods. This is the simplest method of dyeing buff excepting that produced by the sulphate of iron.

COPPERAS BUFF—The sulphate of iron and lime makes a very good buff color, and very cheap. It is dyed in the same manner as nitrate of iron buff, excepting that the goods are generally run through the lime water at the commencement, and not the iron.—About one pound of copperas (sulphate of iron) will dye ten pounds of cotton a deep buff. It is best to give the goods a number of dips. A dark buff cannot be produced by giving the full strength of the iron at one dip. The color is an oxyd of iron. The goods are of a green color when they come out of the copperas liquor, but become yellowish as they absorb oxygen from the air. They have therefore to be aired well every dip. The lime and copperas impart a harshness to the goods, and they therefore require to be run through strong soap suds, to soften their fiber.

By adding about two ounces of sugar of lead to every pound of copperas, a color little inferior to that produced by the nitrate of iron is the result.

ANNATTO BUFF—This color is produced on cotton at one dip, by running the goods through a weak solution of annatto, boiled in the carbonate of potash. This color will not stand exposure to the sun, neither does it wash well, and should never be dyed on cotton. A greater quantity of annatto makes a salmon color.

MADDER BUFF—This is a beautiful buff, and will stand exposure to the sun, as well as iron buff. The goods must be first boiled in lime water, then thoroughly bleached and washed before they can be dyed this color. They are prepared first in a weak mordant of alum for ten hours; then well washed and dyed in a bath of madder, brought up to a a scalding heat. A pound of madder will dye a light shade on 10 lbs. of cotton. The madder is scalded with boiling water, and the clear poured off into the dye kettle, and the goods entered. About half an hour's handling will be sufficient. The goods when brought up to the shade, are washed and dried.

MADDER SALMON—By adding more madder a salmon color will be the result.

All the different shades of buff can be imparted to goods by the quantity of dye stuffs used; but for delicate shades the goods must invariably be bleached. The iron buffs should be dyed in cold liquors.

Buff curtains can easily be washed in a strong solution of soap suds, the soap must never be rubbed upon them, nor should they be boiled.

On Steam and Steam Boilers.

The following is a report from the Manchester *Guardian* of a recent lecture delivered before the Mechanics Institution of that city, by Mr. Fairbairn, C. E., F. R. S., a thoroughly scientific and practical man, whose fame is not confined to his own country. It relates to a most important subject, and demands the attention of all our engineers. We have seen abstracts of this lecture published in some of our foreign scientific cotemporaries, but it is too valuable to curtail. We will therefore give part of it this week, and finish it the next.

"At one time copper, earthenware, and other substances, were used for boiling vessels. It was discovered in 1686, by Dr Hook, that the temperature of boiling water remained fixed, and subsequently Dr. Pepin made the elastic force of confined steam more familiar. Combining this with condensation, Captain Savery applied the power to an engine for raising water; and his boiler (the first, properly speaking) was made of and riveted with copper, which, though a better conductor of heat than iron, was more expensive, rendering it probable that iron plates were used before the introduction of Newcomen's improvements. Cast iron plates were superseded by those of malleable iron; but copper continued to be used, particularly for the fire boxes of locomotives, for which it was preferable to iron. Almost from the first, Mr. Watt used wrought iron; and he discovered that the longitudinal or wagon-shaped boiler was preferable to that of the "hay cock" shape, used by Newcomen and Beighton. Hornblower, Woolf, and others, adopted the cylindrical form, similar to those so long used in Cornwall and elsewhere, where steam of greater density and pressure was employed. A boiler was subjected to two strains—tension, which tended to tear or rip up the outer shell; and compression, which would cut or collapse the internal flues or tubes. These were to be resisted, and that with a maximun effect; and there was a great difference between the resistance to each strain of the metals whose strength per square inch compared as follows, the figures representing tuns:—

	Tension.	Compression.
Wrought-iron Plates	23	12
Copper Plates	16	3
Cast-iron Plates	3	51

Hence, it was important, in construction, to employ that metal which was the most eligible, when the nature of the strain was considered. Watt's discoveries rendered steam of high density unnecessary, when the required forces could be obtained without risk to the boiler; but now, increased power being required, it was obtained by increased pressure, with boilers of improved form and strength. Before the use of high steam, strength was not so important as form.—Watt's wagon-shaped boiler had reference to a large heating surface, and those parts liable to bulge outward were held together by iron stay rods. The advantages of high steam, worked expansively, were early discussed; and both high and low steam were used in the mining districts; but it was only within the last ten or twelve years that manufacturers in this country had appreciated high steam, owing to the increase of manufactures, and the unequal increase in the price of coal. It was used earlier on the continent and in America. In combatting the objections against it many years ago, he demonstrated its saving of fuel and increase of power. With it the double cylinder engine was preferable for regularity of motion, but it did not save more fuel. The irregularity of the single engine was of less importance than many imagined, and was easily remedied by increasing the weight of the fly wheel, and neutralizing the irregularities of the stroke of the piston by velocity. Two engines might be worked together at right angles without these irregularities, and with perfect safety, through the whole range of expansive action. Therefore, he recommended the single engine. It was less expensive, equally efficacious, and, perhaps, more economical than a machine of greater complexity. Considering the facts already stated, we must look forward to the use of a greatly increased, instead of a reduced, pressure of steam. So convinced was he of the advantages of high steam, worked expansively, that he urged preparation for greatly increased progress. It must be obvious that steam generated under pressure, compressed into one-fifth or one-sixth the space it formerly occupied, and again applied to an engine of little more than one-tenth the bulk, must be a desideratum in the appliance of steam. The force applied to one of the largest of locomotive engines, traveling with a train at the rate of 45 miles an hour, exceeded 700 horse power; and there was no reason why factories should not be driven, and the largest ships propelled, by such engines, with greatly increased economy, by well-directed condensation. Soon, this would be more extensively accomplished than might now be considered possible or safe, and space would be lessened and power doubled with greatly increased economy and effect. He and another gentleman had been in communication with the Admiralty respecting the introduction of high-pressure steam upon the same principle as used on the railways; and he was satisfied that, if properly applied, it would effect an important saving in steam navigation. The cylindrical or spherical was the most eligible and the strongest form in which iron plates would resist internal pressure. The deduction for loss of strength on account of riveted joints, and the position of the plates, was about 30 per cent. for the double-riveted joints, and 44 per cent. for the single ones; the strengths (calling the plates 100) being in the ratio of 100, 70, and 56. He found that 34,000 lbs. to the square inch was the ultimate strength of boilers having their joints crossed and soundly riveted. Flat surfaces, frequently essential, were not so objectionable with respect to strength as they appeared to be at first sight, but when properly stayed, were the strongest part of the construction. This was proved by the result of experiments made on the occasion of the bursting of a boiler at Longsight.—Two thin boxes, 22 inches square and 3 inches deep, were constructed. One corresponded in every respect to the sides of the fire-box of the exploded boiler, the stays being in squares, 5 inches asunder, and the side containing 16 squares of 25 in. area. The other contained 25 squares of 6 in. area, the stays being four inches asunder. One side of both boxes was a copper plate 1-2 inch thick, and the other side of both an iron plate 3-8 inch thick. To these the same valve, lever, and weight, were attached, and the pumps of an hydraulic press applied. That divided into squares of 25 inches area were swelled ·03 inch with the 8th experiment, at a pressure of 455 lbs. to the square inch. At the 19th experiment, with a pressure of 785 lbs. to the square inch, the sides swelled ·08 inch; and at a pressure of 815 lbs. the box burst by the drawing of the head of one of the stays through the copper, which, from its ductility, offered less resistance to pressure in that part where the stay was inserted.—The 10th experiment with the other box of 16 inch areas resulted in a swelling of ·04 inch, the pressure being 515 lbs. to the square inch. At 965 lbs. the swelling was ·08 inch, and from that point up to 1,265 lbs. the bulging was inappreciable. With the 47th experiment, at a pressure of 1,625 lbs., one of the stays was drawn through the iron plate, after sustaining the pressure upwards of 1 1-2 minutes, the swelling at 1,595 lbs. having been ·34 inch. The first series of experiments proved the superior strength of the flat surfaces of a locomotive fire box, as compared with the top or even the cylindrical part of the boiler. The latter evidenced an enormous resisting power, much greater than could be attained in any other part of the boiler, however good the construction; and they showed that the weakest part of the box was not in the copper but in the iron plates, which gave way by stripping or tearing asunder the threads or screws in part of the iron plate. According to the mathematical theory, the strength of the second plate would have been 1,273 lbs.; but it sustained 1,625 lb., showing an excess of one-fourth above that indicated by the law, and that strength decreased in a higher ratio than the increase of space between the stays. The experiments show a close analogy as respects the strengths of the stays when screwed into the plates, whether of copper or iron; and riveting added nearly 14 per cent. to the strength which the simple screw afforded. These experiments were conducted at a temperature not exceeding 50° Fah. His experiments on the effect of temperature on cast-iron did not indicate much loss of strength up to a temperature of 600°; and he concluded that the resisting stays and plates of locomotive boilers were not seriously affected by the increased temperature to which they were subjected in a regular course of working. The subject was entitled to further consideration. In boilers it was necessary to preserve a large margin strength as regarded the working pressure and the ultimate power of resistance. Six or seven times the working power was not too much to provide for contingencies.

[Concluded next week.]

Recent News from Europe.

The *Atlantic* arrived in this city on Friday last week, at noon, making a splendid run of less than ten days from Liverpool, which place she left on the 23rd April.

It brought news of the bombardment of Sevastopol by the Allies for nine days, without doing much apparent damage, as the place was still impracticable for an assault.

The Emperor of France had been in England for a week, with his wife, and had been feasted and feated in great style.

The Vienna Conference of European Diplomatists had broken up, without coming to terms. Russia refused to accede to the terms of France and England, to reduce her power in the Black Sea.

Sounding the Niagara River.

John A. Roebling, C. E., has been trying to sound the Niagara river below the Falls. A 40 lb. weight atttached to a No. 11 wire was dropped from a hight of 225 feet from the bridge, but was only out of sight for a second, when it was thrown up to the surface about 100 feet down the stream. The weight had a velocity of 124 feet per second when it struck the water. He believes that no metal has the specific gravity to pierce the current and descend to the bottom.

The Shipping of the World.

The London *News* of the 12th of April, has an elaborate article on the Shipping of the World, which shows that the floating tunnage of the civilized world, excluding only China and the East, consists of 146,000 vessels, of 15,500,000 tuns. The number of seamen it sets down at 800,000, and including the Eastern and other States, of the maritime population of which we have no accounts, there must be at the least a million of persons engaged at sea, and generally on the ocean.

California Coal.

At Los Angelos, California, some Cornish miners are engaged in digging for coal. At various stages of the descent, fissures have been encountered, through which pitch, oil, tar, and gas have issued from the mighty cauldron boiling below. The coal, however, is not yet reached.

Aluminum.

This metal is said to be obtained so easily from clay, by the improved process of M. Deville, of Paris, that it is about to be employed as a substitute for brass helmets in the French army.

(For the Scientific American.)

Photography.

In a late number of the SCIENTIFIC AMERICAN you give the new discoveries of Mr. Mascher; the reason of my now addressing you is to remind your readers of facts long known which Mr. Mascher claims as his discovery. Mr. Mascher, in speaking of his discovery in producing representations of objects on ground glass, cannot imagine for a moment he has discovered anything new. Baptista Porta, of Padua, every photographer knows, discovered the camera obscura, and Mr. Hunt, in his treatise on Photography, page 33 American edition, says; "Its principle will be best understood by the very simple experiment of darkening a room by closing the window shutters, and boring a small hole in them. If a piece of paper is held at a little distance from this hole, the figures of external objects will be seen delineated upon it, and by putting a small lens over the hole they are rendered much more evident, from the condensation of the rays by the spherical glass. If, instead of a darkened room, we substitute a darkened box, meaning a camera, the same effect will be seen to result." This I presume is sufficient to show that Mr. M. is not the discoverer of the camera obscura, for it is this precisely he claims.

Further on Mr. Mascher informs us it is self-evident we have the means of doing with one camera that for which two were deemed indispensable. I refer again to Mr. Hunt's treatise, page 308, English edition, he says: "Sir David Brewster contends that it is not practicable to obtain sufficient exactness by either of these methods, alluding to the use of two cameras with lenses of the same focal length, and with one camera and one lens, by adjusting it at a certain measured distance from the object to be copied, and having obtained one picture, move it round about 20 degrees and take the second image. Sir David Brewster therefore proposes the use of a binocular camera, which he thus describes: In order to obtain a photographic picture mathematically exact, we must construct a binocular camera which will take the pictures simultaneously, and of the same size, that is, a camera with two lenses of the same aperture and focal length, placed at the same distance as the two eyes. As it is impossible to grind and polish two lenses, whether single or achromatic, of exactly the same focal length, even if we had the very same glass for each, I propose to bisect the lenses, and construct the instrument with semi-lenses, which will give us pictures of precisely the same size and definition. These lenses should be placed with their diameters of bisection parallel to one another, and at a distance of two and a-half inches, which is the average distance of the eyes in man, and when fixed in a box of sufficient size, will form a binocular camera, which will give us, at the same instant, with the same lights and shadows, and of the same size, such dissimilar pictures of statutes, buildings, landscapes, and living objects, as will re-produce them in relief in the stereoscope."

Mr. Mascher informs your readers that Sir David Brewster, and a host of others, as far as practical results are concerned, never determined the proper stereoscopic angles; the above proves a different story.

As regards the superiority of small lenses over large ones, every practical photogenist knows it; yes, most amateurs, even, know the superiority of small over large lenses, and as Mr. Mascher justly observes, pictures taken with large lenses produce distortions, but I believe, and the majority of artists will bear with me, that the distortions are not to the extent represented, but they may, by careful examination, be discovered in the finest photogenic portraits to a greater or less extent.

I would not have troubled you with the explanation, but I believe in giving credit where credit is due; Hill claims Neipce's discovery, Cutting claims Archer's discovery, and Mascher claims the discovery of Baptista Porta and Brewster.

JOSEPH FITZPATRICK, Electro Metallurgist.
Rochester, N. Y., April 22, 1855.

[We do not understand Mr. Mascher to claim the discovery of the camera obscura; We had never heard of, nor have we ever seen, stereoscopic pictures produced in the manner described by him. Until we are furnished with positive proof to the contrary, we must entertain the opinion that he has done something which no other person did before him. His practical results, then, are proofs of his first determining the proper stereoscopic angles, and his manner of doing it was entirely different from the plan proposed by Sir David Brewster.

The Cause of Drought.

MESSRS. EDITORS—With your permission I will lay before you numerous and scientific readers what I imagine to be the cause of drought. I believe it is caused by the burning of coal; that the smoke arising therefrom is injurious to vegetation, to the soil, to the air, and to the clouds. The ashes from coal are of no use to the farmer, it depreciates his soil, whether thrown upon it or falling upon it in particles from the smoke. Coal smoke has no sharpness in it, to irritate and stimulate plants; it is entirely devoid of moisture, and it, in my opinion, counteracts the formation of clouds, especially "cirrus," the scarcity of which, for some time past, has been observed. The smoke from wood, on the contrary, has all the properties which coal has not. This subtle fluid, I think, penetrates the atmosphere of the whole world on account of its diffuseness.

The sublimity and grandeur of the clouds, to my vision, are nearly destroyed, and the "powers of the heavens" are considerably weaker, and may gradually grow less as coal is used among men. I am neither a wood nor coal speculator, I wish prosperity to the whole human race. If my belief can be substantiated by any of your scientific correspondents, the removal of such a cause will be of more importance to the world than war in Europe or the acquisition of Cuba to the United States. ONE OF YOUR READERS.

Baltimore, April 28th, 1855.

[Our correspondent has not given us a single reason for his belief in coal smoke being the cause of drought. We take this occasion, however, to impart to him some scientific information.

He says that coal smoke has no *sharpness* in it—does not irritate and stimulate plants, is devoid of moisture, and therefore he concludes it counteracts the formation of clouds. Now suppose all this were true, no reason is afforded him for coming to such a conclusion. The same reasons might as well be presented for coal smoke being the cause of rains, during a wet season. During very dry and very wet seasons, a thousand-and-one reasons are generally given by as many different theorists, as the cause for such seasons; whereas the causes are beyond all our speculations. Wet and dry seasons have occurred since the flood, and they will continue to occur to the end of time, irrespective of the use of any kind of fuel.

The smoke of bituminous coal and wood is the same in composition; there is no difference, for the coal is of vegetable origin.

However useless coal ashes may be, we know that coal smoke (soot) is excellent for plants, and contains considerable potash. Our correspondent is mistaken respecting its qualities in agriculture. It is sold in London in bags to gardeners and farmers like guano.

Neither coal nor wood undergo perfect combustion, when smoke passes off—the smoke is a black loss. In a stove or furnace which burns coal or wood perfectly, gas, which passes off, is mostly carbonic acid, and we can assure our correspondent that it is a pretty sharp gas.

He is mistaken also about the difference of diffusiveness in coal and wood smoke. All gases are obedient to the law of diffusion; that is, light and heavy gases diffuse through one another. The gas produced from the burning of the anthracite coal is nearly pure carbonic acid with no smoke, and is the very same as that given out by all plants during night, and by the whole animal creation in breathing, So *it* cannot be the cause of drought. The summer of 1853 was a very wet one in the region of New York, while that of 1854 was very dry. As coal is the only fuel used here, it could not have affected both seasons so differently.

Our correspondent need not have his fears excited respecting the powers of heaven being considerably weakened, by the use of coal as fuel. The operations of nature take place on such a grand scale, that the efforts of man to change them would be like a pismire aspiring to conduct the siege of Sevastopol.

(For the Scientific American.)

Chemistry of Steam Boiler Explosions.

Permit me to rectify a few errors into which your correspondent, J. B. Conger, has fallen in his article on the Chemistry of Steam. He seems to think that the sudden explosions which sometimes happen in steam boilers may be caused by the decomposition of a portion of the steam, and he bases this hypothesis on the assumption that steam contains twelve times its volume of hydrogen, which assumption is greatly at variance with known facts. A cubic foot of oxygen weighs 592 grains, instead of 48 grains, and the same bulk of hydrogen weighs 37 grains. The constitution of vapor of water, therefore, is two volumes of hydrogen and one of oxygen condensed into two volumes, so that it contains only its own volume of hydrogen. Consequently if steam were decomposed in a boiler by the hot iron absorbing its oxygen, the hydrogen set free would not exert a greater elastic force than did the steam.

Philosophers are now generally agreed that the electricity excited by a jet of high pressure steam is to be ascribed to friction, and not to mere evaporation. Faraday has found that if the jet pipe be made perfectly clean, the electricity will be positive, while the introduction of the least particle of oily matter will cause it to become negative. If it were produced by the evaporation it would always be of the same kind. But however it may be excited, it cannot decompose water, for galvanism is the only kind of electricity which can directly produce chemical changes. SIMON NEWCOMB.

Sudlersville, Md., April 28, 1855.

Inventions Wanted.

MESSRS. EDITORS—Permit me through the medium of your valuable paper, to call the attention of inventors to some of the wants of the country physicians of the United States. First, A small scale which would accurately weigh from half a grain to twenty grains, is much wanted. It should be no larger than a pocket pen holder, and the pan need not be larger than a half dollar, with a delicate spring; it seems to me such a thing might be constructed, and if it could be combined with a small minimeter so much the better. Second, Cannot the axle boxes of buggy wheels be so made as to be greased from an oil can without taking off the wheels? In the course of nearly twenty years' practice, in a hot, dry climate, and over a dusty or sandy soil, I have used up several buggies, and find that frequent greasing is absolutely necessary. It ought to be done every day, and it is a troublesome operation as at present performed. I hope that these suggestions may meet the eye of some of our ingenious mechanics.

AN ALABAMA PHYSICIAN.

April 20th, 1855.

[We have never seen an invention to meet the first want of our correspondent, but if he examines page 60, Vol. 8, he will find one illustrated to meet his second.

Superiority of American Iron.

In a lecture recently read before the London Society of Arts, by Prof. Wilson, on the Iron Industry of the United States, he awarded the prize for superiority in quality to the American over English iron, for railroads. English iron rails, it was stated, were used because they were so cheap. On all the curves, and places requiring the best iron, American iron was preferred, and the manufacturer found a ready market for all he could make at his own furnace.

To Destroy Red Ants.

A correspondent of the Southern *Cultivator* contributes the following method for destroying the above named insects:—"Produce a large sponge, wash it well; press it very dry; by so doing it will leave the small cells open—lay it on the shelf where they are most troublesome, sprinkle some fine white sugar on the sponge (lightly over it); two or three times a day, take a bucket of hot water to where the sponge is, carefully drop the sponge in the scalding water, and you will slay them by the thousands, and soon rid the house of these troublesome insects. When you squeeze the sponge, you will be astonished at the number that had gone in the cells."

Ruttan's System of Ventilation.

A new county jail lately erected at Oxford, Canada West, is warmed and ventilated under Ruttan's plan, and we learn that other institutions of the same character in Canada, are likewise to introduce it. The Oxford Grand Jury were so highly satisfied with the operation of Mr. Ruttan's system, that they introduced the subject in their stated presentment as follows:

"And the jury aforesaid, upon their oath, do further present that they have had their attention especially directed to the system of warming and ventilating the cells and rooms of which they are informed that Mr. H. Ruttan is the inventor, and to them it seems that this system is so nearly perfect as to meet the entire wants of the case, and to leave scarcely anything to be desired."

Mr. Ruttan's method has been often referred to in our columns. (See engravings also on page 299, Vol. 6, SCI. AM.) We have long regarded it as the only truly economical and effective way of ventilating city and other buildings with which we are acquainted, while for large public institutions of every character it is equally admirable. By its use, the temperature of apartments, no matter how numerous they may be, can be steadily kept at any desired point in winter, at the same time that a ventilation imperceptible but most thorough, is in constant operation. In summer the ventilation is equally excellent. We wonder that the officers in charge of the erection of our school houses, prisons, churches, hospitals, &c., have never adopted this, or some kindred system. In all private dwellings its introduction effects a saving of fifty per cent. or more in fuel, besides heating every part thereof, and securing families from that universal destroyer of health—impure air.

We regret to learn that the large and splendid passenger car on the Erie Railroad, which was fitted up for ventilation on Ruttan's plan, and which has been used with so much success for several months past, was burned in the fire which consumed the railroad depot of Jersey City, a few days since. We have been told by a gentleman who is a frequent traveler over the road, that when Ruttan's car was in the train it was always crowded; the passengers would leave the other cars, where there was plenty of room, to enjoy the pure atmosphere, even temperature, and freedom from dust, which this improvement effected. It is said that the car was just as warm at the seats nearest the door as in the center, and that the air on the floor was heated just as much as next the roof. The heating was done by one small stove.

Eclipse of the Moon.

The total eclipse of the moon on the night of the 1st inst. was a fine scene. We thought as we witnessed the dark shadow of the earth stealing over the moon's disk, of the many telescopes that were then pointed to it, and the light which science had thrown around the phenomenon. At one time—not many years since either—people in their ignorance believed that such events were precursors of evil, social and national, such as death, war, famine, or pestilence. The Hindoos believe that an eclipse of the moon is caused by a great serpent—a spirit of evil—endeavoring to swallow the moon.

Astronomy is now perhaps the most exact of sciences. The very moment when an eclipse will take place can be predicted years before-hand.

New Inventions.

Improved Shuttle.

Two patents have been granted this week for improvements in the shuttles of power looms, one to E. P. Marble, of New Worcester, Mass., and the other to Laroy Litchfield, of Southbridge, Mass. The two are entirely dissimilar in character, although they relate to the same instrument—the simple shuttle.

The patent of Mr. Litchfield embraces a novel method of applying a spring to keep the shuttle cop in place, and which admits of the repeated raising and replacing of the spindle to renew the yarn, without causing such wear as to throw the spindle out of place. It also embraces a regulating screw, to bring the spindle at once to a proper position in the shuttle. A spring catch is also employed in such a manner as to confine the bobbin (when one is used,) so that without changing the position of the spindle, or rendering it unsteady, a large or small bobbin may be secured in the shuttle.

The invention of Mr. Marble relates to an improved mode of applying the spring catch that is employed to confine the bobbin in shuttles, by which it adapts itself to varying sizes of the heads of the bobbins, and whereby it is drawn square off the bobbin heads with the spindle, so as not to drag upon and split the heads—a fault common to shuttles now in use. The improvement also enables the catch to be conveniently applied to the cop shuttle, to confine the tube of the cop, or the cop itself if spun without a tin tube. The catch to confine the cop is made with a small notch to receive the collar of the tin tube, and it has a point to catch and confine the cops which are made with paper tubes.

Railroad Ticket Register.

The claims on another page, of the patent granted to Wm. Apperly, of Louisville, Ky., embrace improvements in railroad traveling, the object of which is to overcome the objections raised by railroad companies and travelers, relating to the reception of fare from passengers by conductors, after the cars have left the various stations on the route.

The present regulations are not good, for there is always a disagreeable crowd around the office when the tickets are being distributed. This machine is intended to cure these evils, and introduce a pleasing reform to the managers of, and those who travel on our railroads.

The invention consists of a neat machine provided for each car, which holds a sufficient number of tickets, and which can discharge them at the will of the conductor, and register them as discharged. The distribution of the tickets is under the control of the conductor, but that is all. It is a tell-tale and ticket clerk which gives up its account to the proper officer (who keeps the key) when the train arrives at the end of its route. The tickets placed in each machine have the names of the place and fares printed on them, and the machine registers these against the conductor.

Improved Horse Power.

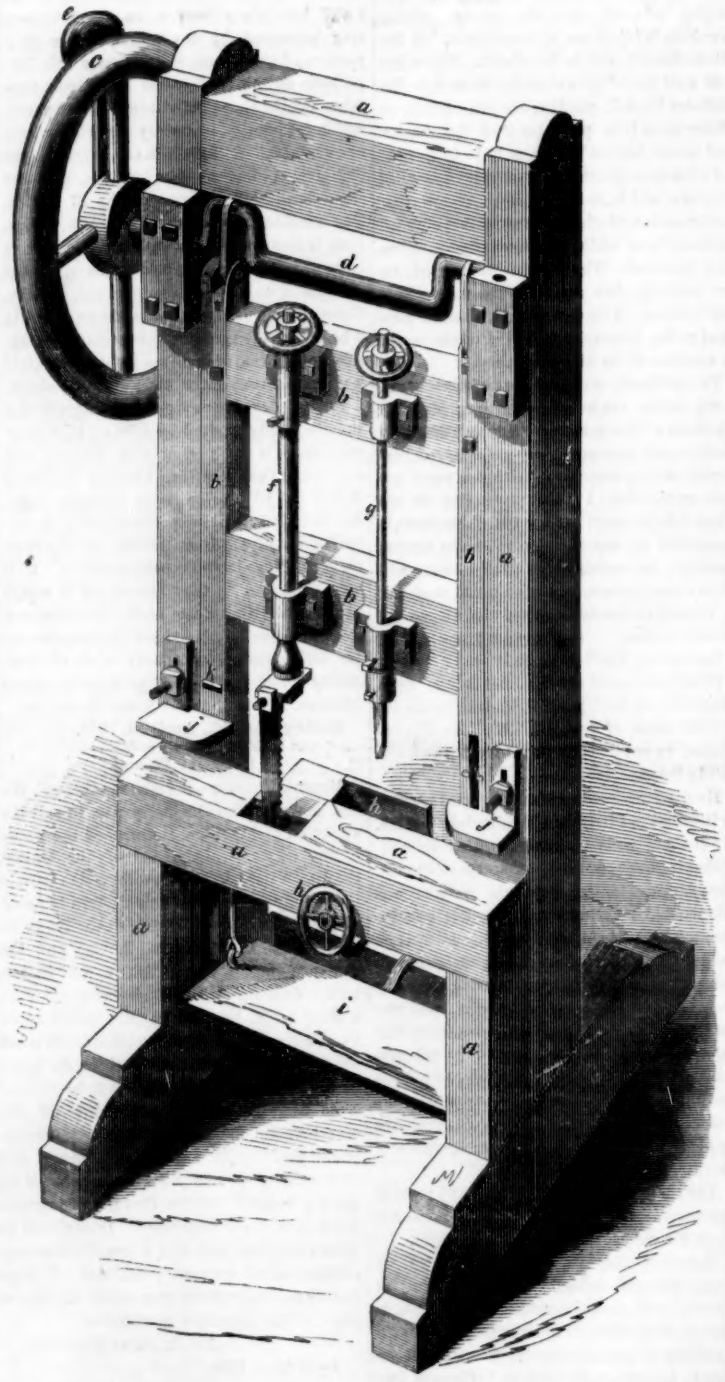
Quite a number of patents have been granted for horse powers, and for improvements on them, but the patent granted this week to C. Russell, of Ohio, as set forth in the list of claims, affords proof that improvements on such machines are not ended. The improvement of Mr. Russell relates to double geared horse powers having an annular internal cogged driving wheel, and two transmitting pinions. Its object is to keep the axis of the driving wheel steady, and to provide for the perfect gearing of the pinions with the driving wheel, to obviate an evil incident to such horse powers. The axis of the driving wheel is fitted snugly in a self adjusting box, which is made in two parts, and fitted in an oblong slot formed in the bridge, and in which it can slide freely back and forth, preventing the axis having any vertical play, (up or down,) also any lateral play, thereby rendering its action very steady, even though there may exist some imperfection in the fitting of the gearing, from shrinkage of the castings or other causes.

Fire Engines.

The patent granted this week to John R. Adams, whose claims will be found on another column, embraces a fire engine having a number of cylinders placed radially in a ring, and encompassed by a cam ring, which works loosely around them. These cylinders are provided with pistons and valves, the former of which are operated by rotating the cam, which has a zig-zag or cam groove in it, into which rollers attached to the ends of the piston rods fit. By rotating the cam ring, it will easily be understood how the zig-zag groove will give a reciprocating motion to the pistons.

The cam wheel may have a number of levers secured in it, like the hand-spikes of a windlass, and by being set horizontally, a horse may be harnessed to each and driven in a circle, so as to make it a very powerful pump for mines on high elevations, where fuel is expensive to get up, for operating a steam engine. It is also adapted for manual or steam power.

MORTISING AND TENONING MACHINE.



The annexed engraving is a perspective view of an improvement in the above named machines, for which a patent was granted to Elihu Street, of Montville, Ct., on the 20th of March last. The nature of the invention consists in the combination of certain tools used by carpenters in the manufacture of doors, sash, and blinds in such a manner as to avoid loss of time occasioned by removing the work from one machine to another.

a represents the parts of a stationary frame, and *b* a slide frame. *c* is the fly wheel, and *d* a crank shaft connected to the slide frame by joints. *e* is a counter adjustable weight to balance the slide frame, and *f* is a rod attached to a saw, and connected to a hand wheel for tension, to adjust the saw. *g* is a rod attached to the chisel socket, having also a hand wheel to adjust it; *h h* represents a sliding gauge operated by a hand wheel. *i* is a foot board attached to the slide frame, to set the machine in motion. *j j* are movable stops. *k* is a plane iron for jointing the ends of boards, &c. *l* is a plane iron for tenoning.

The saw is fastened by screw bolts, and it can be taken off when not required, or be reversed, or turned out of the way when using other parts of the machine, and it can be set to cut at different widths. When using the chisel the saw should be reversed, and when using the saw the chisel should be removed or raised upwards and fastened by one of the set screws. The counter balance, *e*, gives effect to the working of the tools at the particular point desired. When using the smoothing plane, *k*, a board should be run forcibly against it; when it will be smoothed and jointed. The plane, *l*, for tenoning should be used in the same manner. The movable stops, *j j*, are for fastening down the lumber to the action of the tools. The hand wheel, *h*, in front of the bench, is attached to the gauge by a rod having a screw; the rod runs through the bench, and by turning the wheel, the gauge is moved backward and forward by the screw. This gauge is used in mortising and sawing. The footstep, *i*, is attached with rods to the slide frame. By pressing with the foot downward upon it, the machine is set in motion—it is the stirrup for the foot to operate the machine.

The claim is for "mortising, tenoning, sawing, and smoothing, by combining certain tools together (in one machine) used by carpenters in the manufacture of doors, sash and blinds."

More information may be obtained by letter addressed to Mr. Street, at Montville.

Clothes Pin Machine.

The three claims, on another page, embraced in the patent just granted to H. and M. Blake, of Hartland, Vt., relate to the employment of a holding wheel and circular saw, arranged and operating conjointly, for cutting the slots in the pins; also for the means used to hold or feed the pins to the saw; also for the combination of the saw and bevel cutters, whereby the slots or grooves in the clothes pins are finished at one operation. The saw used has a number of radial slots cut in it, and one edge of each slot is beveled and made with a cutting edge to form side cutters at each side, for smoothing and finishing the grooves. The pins are fed in by hand into the rotating feed wheel, into concave holders, and they are carried along, operated upon by the cutters, and discharged, when finished, from the machine; none of the parts of the machine are stopped, and no adjustment of them required during the whole operation.

New Bullet Mold.

The improved bullet mold for which a patent is granted this week to Wm. Ashton, of Middletown, Conn., is for casting the Minie bullet, the chamber of which is a hollow cone. The object of the mold is to cast such bullets with greater facility than by any of the molds heretofore used. To form such bullets, the mold must be made with a core. Those now used open longitudinally and have a fixed core; this new mold has a movable core, and opens transversely. It is so made as to allow air to escape when running in the molten metal, and to cut off the surplus when the mold is full. It makes very perfect bullets with great rapidity.

Boot and Shoe Stretcher.

The patent granted this week to Warren Holden, of Philadelphia, relates to the stretching and fitting of boots and shoes by an adjustable last. The last is divided into a number of parts, and these can be operated by a lever and screw when put into a boot or shoe, so that any part of it (the boot or shoe) may be stretched and made to fit the foot exactly—a good improvement.

Fees under the Patent Law of 1790.

Under the good old law of 1790, our Government charged the following fees:—For receiving and filing the petition, *fifty cents*; for filing specifications, *ten cents* for each hundred words; for making out the patent, *two dollars*; for affixing the great seal, *one dollar*; for endorsing the day of delivering the same to the patentee, including all intermediate services, *twenty cents*. Total $3,80.

Fall of a Suspension Bridge.

A new suspension bridge erected over the Passaic river above the Falls, at Paterson, N. J., fell on the 3rd inst., when a test of twenty tuns was applied. Some persons who were on it when it fell were severely injured. This was the second suspension bridge erected at the same place within one year. There must have been bungling calculations made by somebody.

The *New England Farmer* states, that potatoes are selling in Boston for $1.20 per bushel; 80 cents less than in this city. Nova Scotia has sent great quantities to Boston this spring.

Scientific American.

NEW YORK, MAY 12, 1855.

Education in New York City.

We have before us the recently printed report (being the 13th) for 1854 of the Board of Education. From it we learn that there are 262 schools within the jurisdiction of the Board, with an average attendance, exclusive of the evening, normal schools, and Free Academy, of 45,390 pupils; the total, including these schools, being 51,567, or about 197 to each school. There are 146,450 pupils' names on the report, or two-thirds more than the average attendance, a statement which greatly surprises us. The amount of money expended for the purposes of education during the year, amounted to $776,973, averaging more than fifteen dollars for each of the 51,567 scholars. The *United States Gazette*, Philadelphia, claims for that city a larger number of pupils (52,073,) with as complete a system of education, for only $456,719, or $8,79 for each pupil—only a little over one-half that of New York. This shows that the New York Board of Education is behind Philadelphia in economical management.

There can be no doubt but New York pays very liberally for the education of her children, and we might reasonably expect the young and rising generation to be the most soundly educated in the world. We have no such hopes, however, and no such expectations because it appears to us that the system of teaching is wrong. The Board of Education, with perhaps a laudable ambition to teach the young a little of everything, have adopted a system which ends by teaching them nothing. The pupils of New York are furnished with such an abundance of books, that their tendency is to confuse, not educate. There is an effort made to cram a monstrous diversity of knowledge into the minds of the children, which results in cramming out what was learned yesterday, by what has to be crammed in to-day. Thus a girl of ten years of age has as many books to study as would load a pack horse. She studies arithmetic, history, grammar, astronomy, natural history, philosophy, mineralogy, geology, chemistry, and physiology—ten different studies. And the Board speaks in flaunting terms of this system; why, it is a plaster on common sense. We have witnessed with much pain the efforts of children in committing long lessons in geography, physiology, chemistry, history, &c., to memory, all of which were forgotten in a few days, because it was mentally impossible to retain them. Cut down the studies of such from ten to four books, and we will have more soundly educated children. They will not grow up as they are now doing—superficial in everything.

Enforcing the New Steamboat Law.

We have before us two reports of the Inspectors under the New Steamboat Law,—the one from the District of St. Louis, the other from that of New York. The Report of the Inspectors of St. Louis, Mo., James H. McCord and H. Singleton, relates to the collapsing of both flues of the middle boiler of the steamer *Reindeer* on the 7th April, 12 miles above St. Louis. By this accident three firemen were so severely scalded that two of them have since died. The Inspectors exonerate the engineer, the captain, and all the officers, of blame, and assert that the accident was caused by defective flues. These had been examined by the Inspectors of the Louisville District, in 1854, and a certificate given that they were one quarter of an inch in thickness, whereas, they were found to be a little less than three-sixteenths of an inch. As the boiler had been afterwards examined by the St. Louis Inspectors, we think that those of Louisville will assert that when they gave their certificate, (8th April, 1854,) the flues were of the thickness represented on the certificate, and they may throw the blame on the St. Louis Inspectors.

The boilers of the *Reindeer* were five in number, 30 feet long and 40 inches in diameter, with two return flues, 15½ inches in diameter. Messrs. McCord and Singleton have condemned the whole of them as being dangerous, and have ordered new and improved ones to be substituted. They condemn the 15½ inch flues as dangerous in boilers of such a diameter, and have certainly in this case ordered a sure remedy.

The other Report, that of John M. Weeks and Henry B. Renwick, Local Inspectors of this port, relates to the limited suspension of the license of John I. Low, fifth class engineer, for negligence in permitting the water in the boiler of the steamboat *Splendid* to fall below the water line on two occasions. Charges were preferred against the engineer for neglect, and this is the result. The suspension took place on the 1st inst., and will continue four months. On none of these occasions did the water fall lower than three inches above the flues, but negligence was shown, and our Inspectors know that they cannot allow the law to be trifled with. It gives us great pleasure to know that we have so many faithful men to enforce the New Steamboat Law.

It would have afforded us sincere satisfaction had our Legislature passed a law during its last session, providing for Inspectors of all steam boilers, stationary and locomotive, in the State. Every State in our country should have such an Inspection. It would be the means of preventing many sad catastrophies. Two weeks ago, a boiler in Geer's foundry, Troy, N. Y., weighing 6 500 lbs., exploded, passing up through the roof, to a hight of 75 feet, smashing everything in its way, and landed more than a hundred feet from where it started. Sixty men and boys were employed in the foundry at the time, and by good fortune only two were injured—none killed. The explosion was no doubt caused by an over-pressure of steam; the wonder is that so few were hurt.

The Boston Steam Fire Engine.

A fire took place in Boston on the 29th ult., by which $1,000,090 worth of property was consumed, including two fire engines; yet we have been informed that it never was attempted to bring the steam fire engine into operation. This engine, "Miles Greenwood," for which the city of Boston recently paid $12,000, was suffered to stand idle during the fire, although it might have done a great deal to stop the conflagration. What is the matter with this Engine? Let us know the whole truth about it. It operated well on the trial in this city, and impressed many very favorably with its powers and utility.

The City of Boston, at one time purchased a number of "Fire Annihilators," one of which exploded prematurely when being carried to a fire, and thus sealed the fate of the others; they were sent to repose in a cellar, or some such place, and never attempted to be used. We are anxious to know something about the "Steam Fire Engine," because we have always taken an interest in fire engine matters, and heartily wish success to the working of such machines by steam, instead of severe manual labor, respecting which we know considerable from personal experience

Navigation of the Hudson River.

It seems that Professor Renwick has been writing a series of articles to the Albany *Evening Journal* on the navigation of the Hudson River, in which he takes the ground that the driving of piles and the formation of docks at New York affects the depth of the channel and the velocity of the water as far up as Troy, The Albany *Knickerbocker*, in answer to this, says, "The Professor runs away with the idea that our water is growing less and less annually. This is not so. In front of this city, the water is as deep now and runs with as much velocity as it did fifty years ago. Opposite the pier, the water is sufficiently deep to accommodate half the ships that enter the port of New York. It is not a short supply of water which injures the navigation, but an over supply of sand bars. These bars are caused, not by driving fishpoles in the river opposite Hoboken, but by the neglect of the government and the washing away of the Greenbush bank. The bars which formerly bothered us, have entirely disappeared. Among those which annoy us now are several just below the village of Greenbush, and one in the vicinity of "Nine Mile Tree." The former could be overcome by an outlay of ten thousand dollars, the latter by two months of common sense digging."

[The editor of the *Knickerbocker* is right, excepting in attributing all the blame of the obstructions to navigation near Albany, to government neglect. If the government has failed to do its duty—has been neglectful, the people of Albany have not exhibited good common sense in waiting and begging government for assistance. It would soon pay them with compound interest, to adopt means for the protection of the Greenbush bank. True, they have done something in this way, but how clumsy, and how inefficient. They should build a strong wall of groined arches along the whole Greenbush bank below the lower Ferry, and keep delving into the sand and mud banks continually. There can be no doubt but there is enough water in the driest seasons, in the Hudson at Albany, to float a seventy-four gun ship. No canal is wanted, as has been proposed, to make the ports of Albany and Troy navigable for vessels of a thousand tuns burden. The chief engineers of the cities of Troy and Albany should be men of civil and mechanical qualifications, to engineer any work; and the condition of the Hudson in their respective districts, should be under their charge. If these two cities were to act upon this advice, we are confident it would tend greatly to their prosperity.

Presentation of a Plow.

We learn by the Vincennes, Ind., *Practical Farmer*, that a handsome plow was recently presented to the Hon. H. L. Ellsworth, ex-Commissioner of Patents, by T. E. Brinley, of Kentucky. From the speeches made on the occasion, we learn that this plow is quite a Don among the plows, having taken no less than thirty-nine premiums.

Mr. Ellsworth in reply to W. Stringfield, who presented the plow, did not use any high-flown words on the occasion, but said it was a beautiful plow, and would afford him great pleasure to test it with a dynamometer, in order to determine its draught. The plow is made of steel, and has a polished mold-board, as cast and wrought-iron mold-boards are not suitable for plowing the soil of the Wabash Valley. It seems that Mr. Ellsworth has dispensed with the plowman so far as it relates to holding the stilts. He said, "for years no one has held my plow, or dropped the corn. My plow beam obtains its steadiness by being attached to an axle, or two mole wheels; and a wheel of 18 inches diameter, made of 1¼ inch board, having an artificial finger fastened at one side, that dips into a measure of corn at each revolution, deposits the seed, which is covered by the next furrow."

When he was in the Patent Office (he stated) he always advocated an Agricultural Department to protect and foster this important branch of national industry, "but politicians courted the farmers' votes during canvass, then forgot their promises as soon as they reached Washington." We agree with Mr. Ellsworth in this. There should be an Agricultural Department in Washington, and it should be sustained and supported liberally by our General Government, but our inventors should not be taxed to support it.

Consuming Smoke.

It would appear from a statement in the Londen *Illustrated News* that the new law in England to compel the consuming of smoke in furnaces, operates injuriously to the interests of many. The proprietors of the *News* state that the injection of jets of cold air above the coal, in their furnaces, involves a loss of 15 per cent, instead of being a saving, as had been predicted. They had tried a number of furnaces, all of which had failed to give satisfaction. We know that it is a mistaken notion, entertained by many, that very long boilers, and long tortuous flues save fuel, and it appears to us that the mixing of cold air with the hot gases, in order to produce perfect combustion, is just as incorrect a notion. It cannot be denied, however, that all the fuel which passes off in a state of smoke is positive loss. "Can this be consumed to advantage?" is the grand question. We believe it can, but the air for mixing with it, should always be highly heated before hand. If the proprietors of the *Illustrated London News* would adopt means to heat the air before mixing it with the smoke of their furnaces, we have no doubt that, instead of a loss of 15 per cent. over the old methods, they will effect a saving equal to that amount.

Splendid Engines for the Cleveland Water Works.

On Thursday afternoon we experienced the pleasure of witnessing and examining the two new steam engines, pumps, boilers, &c., designed, and built by the Allaire Works, this city, for the City Water Works of Cleveland, Ohio. The engines—two in number—have cylinders 70 inches in diameter, and 10 feet stroke, with pumps 30 inches in diameter, and 8½ feet stroke. They are constructed on the Cornish plan, this being allowed to be the most economical for pumping engines in the world. They have received a very high finish, and taking them for all in all, we believe they are the best finished engines we have seen in our country. Each engine is a perfect duplicate of the other, in every part, to the smallest curve and the minutest line. The beams are huge masses of metal, each weighing about 30 tuns. They do great credit to New York engineers, and especially those engaged in designing and constructing them. The city of Cleveland, in getting such engines, has exhibited a noble and interprising spirit. They have far distanced the people of Chicago.

These engines are to be placed near the lake, from which they are to draw water and throw it to a considerable distance, into a reservoir, on an elevation of 170 feet, from which it will be led by gravitation across the river, and distributed to the city.

The boilers for these engines are six in number, on the Cornish plan—high pressure. They possess a large amount of heating surface. All the castings are very fine, and the greatest care, and the best of skill have been exercised to produce engines of which New York and Cleveland may well be proud.—The architecture of the machinery, and the drafting of all the details, deserve great praise.

The engine house will be constructed of brick work, with iron cornice window frames and sills, from designs of Mr. Scowden, the engineer of the Water Works.

The Steamship that was the "Ericsson."

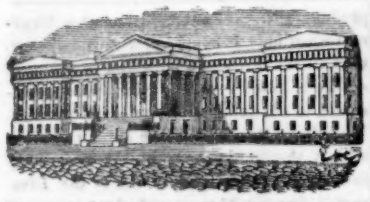
This ship—with her hot-air engines consigned to the tomb—made her first trial trip with her new steam engines, down the Bay, on Thursday afternoon last week. The New York *Times* says of it, "There was not so great or good time as when she made her hot-air trial trip." The *Tribune* says, "she returned to the city having made a very satisfactory trip."

And thus it is that those gentlemen who two years ago were so enthusiastic and eloquent respecting a project which proved an utter failure, and which sound scientific engineers very well knew would turn out so, have only a few words to say respecting the great invention which was, in their opinion, destined to revolutionize the world and to annihilate steam. Our Lieut. Governor Raymond, and Mr. Dana, should certainly have been invited to make speeches on this occasion, in order to make public confession for the erroneous statements they made on their "hot-air trip."

The hot-air engines being abandoned, we would think it creditable to those eminent men of science, who spoke so confidently of their success two years ago, to come out now before the public and *confess* their error.

Another Asteroid.

M. Le Verrier in a letter to Lieut. Maury, dated Paris, April 7th, announces the discovery of another asteroid, being the thirty-fourth of the system of small planets between Mars and Jupiter.



[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office,

FOR THE WEEK ENDING MAY 1, 1855.

PROJECTILES—W. J. Von Kammerhueber, of Washington City, D. C. : I claim the lens shape of the projectile, made of any desirable material or combination of materials, solid or hollow, as described, and which projectile is to be thrown by any exploding or expanding substance.

ARRANGING SHAFTS AND PULLEYS AT AN ANGLE—Abner Whiteley, of Springfield, Ohio: I do not claim communicating motion when the axes form an angle with each other by means of a cross-head or pin attached to one axis moving within grooves or slots attached to the parts of the other axis or pulley, as that is well known.

But I claim the described mode of arranging the bearings, consisting of the stud or projection from the bearing of one shaft, which stud is a bearing for the pulley, gear wheel, or coupling of the other revolving part, and through which the axis having the pin, passes, for the purpose of forming a secure and compact adjustment of the parts when the respective axes of motion have a fixed and invariable angle with each other.

LUBRICATOR—R. M. Wade, of Wadesville, Va. : I make no claim to the shutting off of one passage of the lubricator when opening the other, by arrangement of valve perforations, as set forth.

But I claim constructing the moving parts of a central sectional spindle, with disk valves at its extremities, susceptible of steam-tight adjustment, as described, and combining the same with the perforated diaphragm, a, of the oil reservoir for preventing external leakage, and otherwise acting, as set forth.

Also the sectional rim, P, and spring, S, in combination with the arrangement of the valve apertures relative to the ends of said rim, so as to furnish three stopping points to the actuating lever, for feed, discharge, and the entire closing of the lubricator when operating, as set forth.

SELF-LOADING AND UNLOADING CARTS—J. Wilkinson, of Hopewell Cotton Works P. O., Pa. : I claim in self-loading and unloading carts, the combination and arrangement in one vehicle of a series of two, three, or more, comparatively small scoop shovels or scrapers, and their respective carrying boxes, so that each of the series can be loaded in succession, independently of the others, while the vehicle is in motion, thus, owing to the shortness from front to rear of the scoops as to be forced into the substance with which the cart is to be loaded, and the smallness of the quantity to be taken up by each, avoiding the necessity of employing a powerful team, or of hitching on an extra team, while the vehicle is being loaded, as is usually the case in taking up a sufficient load for an ordinary team in a cart having but one large scoop; and so that when the vehicle is removed to the place where the load is to be deposited, all the boxes of the series can be dumped or unloaded simultaneously without stopping the team, and leave the contents spread out in a layer of uniform or nearly uniform depth, the whole being constructed and operated in the manner and for the purposes set forth, or in any other manner substantially equivalent thereto.

I also claim the manner of operating the scoop and boxes, by means of levers connected to them by two rods, or their equivalents, to each lever, the one attached to the box being connected with the lever nearer its fulcrum than the one attached to the scoop, so that operating the lever will move the scoop through a greater space than it does the box, thus enabling the scoop to be depressed a sufficient distance to take up its portion of the load, and then elevated so as to constitute the front of the carrying box, while at the same time the box is elevated by the rod attached to the lever nearest its fulcrum a sufficient distance to be clear of the surface over which the vehicle is to be conveyed, substantially as described and set forth.

I also claim the manner of attaching the scoop boxes to the adjustable frame, and the adjustable frame to the fixed frame, by means of sliding bars or rods, or their mechanical equivalents, so constructed and arranged that the scoops and boxes are capable of a vertical, but not of a horizontal motion, except as the whole vehicle is moved, thus enabling the scoops while being loaded to be held firmly at any desired depth against the substance to be taken up by them, substantially as specified.

REGULATING THE DISCHARGE OF EXHAUST STEAM IN LOCOMOTIVES—John E. Wootten, of Philadelphia, Pa. : I claim the arrangement of the piston, E, within the cylinder, D, in communication with the steam or water space of the boiler, and with the exhaust chamber C in relation to the spring, n, rods, and levers, and beams, h j k l m, and valve, c, operating as and for the purposes set forth.

POLISHING LEATHER AND MOROCCO—Nathan Ames, of Saugus, Mass. (assignor to Samuel Green, of Lynn, Mass.) : I claim the described method of raising the figuring or polishing tool, R, while passing back over the table, T T, i. e., by making the tool holding hand, in effect a fixed part of the connecting arm, F F, constructed and combined substantially as described, so that the machine partaking of the nature both of a reciprocal and rotary motion, may operate without joint, noise, or friction, as easily and silently as a wheel revolving on its axle, and as rapidly as may be desired, and at the same time moving in a uniform ellipsoidal orbit over the table without touching it.

FURNACE FOR BURNING BAGASSE—Elizabeth A. Stillman, of New York City, administratrix of Alfred Stillman, deceased : What is claimed as the invention of the said Alfred Stillman, is the described furnace for employing bagasse, without previous drying, as fuel for generating steam.

BORING FENCE POSTS—James Temple, of Birmingham, Pa., (assignor to Israel Ward and James Temple) : I claim the supporting of the long pinion, and the auger shanks, in the adjustable hinged pillar blocks, such as described, so that the augers may be set to bore holes at variable distances apart, whilst the spur wheels on their shanks shall still keep in gear with the long pinion, as described.

SAWING FIRE WOOD, ETC.—E. A. Tubbs, of Hampton, N. H. (assignor to E. A. Tubbs & H. T. Croxon, of Dorchester, N. H.) : First, I claim the method substantially as described, of bringing the saw into operation by the pressure of the log upon the stop, Z, as set forth.

Second, I claim the method, substantially as described, of causing the weight of the saw, after it has passed through the log to bring into operation the mechanism which raises it out of the way preparatory to making another feed.

Third, I claim the method described, of operating the clamp, C', by means of the spring bar, D', whereby the clamp is rendered capable of holding logs of varying thicknesses, without constant re-adjustment, as set forth.

Fourth, I claim the device described for the purpose of stopping and starting the feed at the required moment, consisting essentially of the combination of the shaft, O, the lever, T, the wheel, N, and the shipping finger, Q, constructed and operating in the manner substantially as set forth.

TICKET REGISTER FOR RAILROAD CARS—William Apperly, of Louisville, Ky. : I claim, first, the described improvement for distributing and registering railroad and other tickets, consisting in the combination and arrangement of the slide, c d, spring, D, and registering device, H I J K L M, or its equivalent, substantially as set forth.

Second, I claim providing the extension, E, and inclined way, E', substantially as and for the purpose set forth.

[This is a useful invention for railroad companies, and a description of it may be found on another page.]

FIRE ENGINE—John R. Adams, of Port Jervis, N. Y. : I claim having the cylinders, B, placed radially in a band or ring, A, and encompassing said band or ring, A, with a band or ring, I, and cam, J, the band or ring, I, and cam, J, being allowed to rotate around the band or ring, A, and cylinder, B, and operating the pistons of the cylinders, in consequence of their connection with the cam, as shown and described.

[A brief description of this improvement in fire engines may be found on another page.]

BULLET MOLD—William Ashton, of Middletown, Conn.: I claim constructing the mold, as shown and described, viz., having a conical aperture, a, made in a piece of metal, and having a projection or cone, E, and flanch, d, attached to a metal strip, D, which is secured to the shank or handle, C, of the mold by a pivot, c, so that said projection or core may be inserted in and withdrawn from the aperture, a, as shown and described.

[It is a singular fact that in time of war, inventions in ordnance—fire arms, projectiles, and even bullet molds, are multiplied to a wonderful extent. Our weekly list of patents bear testimony to this. See notice of this invention on another page.]

CLOTHES-PIN MACHINE—H. and M. Blake, of Hartland, Vt. : We do not claim the holding cylinder, D, irrespective of its construction and arrangement, and the manner in which it operates in connection with the saw, B, as shown. Neither do we claim the saw, B, separately, nor the cutters, K K, for they have been used for analogous purposes.

But we claim, first, the employment or use of the holding cylinder, D, and circular saw, B, when both are hung on permanent shafts, and operating as shown, so that the cylinder rotates with a comparatively slow motion compared with the saw, and conveys by a continuous rotary motion the clothes-pins over against the saw, for the purpose of forming the grooves or slots therein.

Second, we claim securing the clothes-pins in the holders, E, of the cylinder, D, by means of the clamps, F, secured to the periphery of the cylinder, D, as shown, and operated by the rim or ledge, m, and flanch, as shown, so that the clothes-pins will be firmly clutched in the holders, E, while being operated upon by the saw, B, and cutters, K K, and allowed to fall therefrom when the grooves or slots are finished.

Third, we claim the combination of the cylinder, D, saw, B, and cutters, K K, constructed, arranged, and operating as shown and described.

[This novel invention we hope to illustrate in our columns in a few weeks. In the meantime our readers must be content with the brief description to be found on another page.]

WHEELWRIGHTS' BORING AND TENONING MACHINE.—Chauncey Cowdry, Orrin Tolls, and C. C. Tolls, of Ithaca, N. Y. : We claim, first, the combination and arrangement of the frame, R, with the scale of graduated and sliding tubes, T, and screw, U, as described.

Second, the combination of the hinged support, B2, with the sliding screw clamp, C3 substantially as described.

Third, we claim the combined arrangement of the several parts, substantially as described and set forth.

PROCESSES FOR PURIFYING AND CLEANSING WHEAT.—Charles Campbell, of California : I do not claim the smut mill, or improvement thereon, or any new chemical quality of lime, but the preparation of lime for this particular purpose, and the application of it to wheat when newly slaked and warm, so as to much more effectually cleanse the wheat from all impurities, than by any other process.

MACHINE FOR BUNDLING FLEECES OF WOOL—John How, of Deer Creek, Mich : I claim, in combination with the packing box, the adjustable straps, k, with the piece, l, and the levers, g and p, for pressing the bale, and furnishing in a convenient position for the operator, the strings or cords, by which the pressed fleeces are baled up, substantially as described.

APPLYING ECCENTRIC WHEEL TO WATER POWER—J. B. Hurt, of Nottoway Co., Va. : I claim the water wheel without arms or main shaft, revolving on fulcrum wheels underneath, thereby lengthening out the lever power near the whole diameter of the wheel, the thin and thick interties shouldered and bolted to each rim, the cast segments bolted to the middle rim, which gears into the cogs of the wollower on the horizontal shaft extending across on the inside of the water wheel, also the two revolving fulcrum wheels with flanges on the outside of each wheel, to keep the water wheel in its true position.

SHUTTLES FOR LOOMS—Leroy Litchfield, of Southbridge, Mass. : I claim the backward extension of the heel, c, of the spindle, as described, combined with the application of the spring, d, above the said heel, and above and in rear of the pin, b, on which the spindle moves in such a manner as to hold the spindle in its operative position, by throwing its heel upwards against a proper fixed bearing, substantially as described.

[A brief description of this invention may be found on another page.]

SHUTTLES FOR LOOMS—Ezra P. Marble, of New Worcester, Mass. : I claim attaching the catch, C, which confines the bobbin or cop on the spindle to a pin, e, which works perpendicularly through the spindle, and is acted upon for the purpose of throwing and holding the catch in operation, by a spiral spring, g, or its equivalent, and acted upon for the purpose of throwing the catch out of operation by coming in contact as the spindle is raised with a plate, D, or other fixed stop, the whole operating substantially as and for the purpose set forth.

[A short description of this shuttle may also be found in this week's SCI. AM.]

HORSE POWERS—Clement Russell, of Massillon, Ohio : I do not claim having the axis of the main driving wheel of double geared horse powers movable, as this is common.

But I claim providing a broad solid flanged box or center, C, for the axis, A, to rest in, when said box is made in two parts, D D', and fitted and confined by the axis itself, and flanges, a a a a, in an oblong slot, E, formed in a bridge, F, as constructed and arranged in the manner and for the purpose set forth.

[The subject of horse powers interests a great number of our readers, and even small improvements in that line are of much consequence, so vast are the number used. A description of this improvement may be found on another page.]

CORN PLANTERS—Presley Raines, of London, Ohio : I claim the combination of elevator, sliding platform, and flaring plunger, substantially as described, operated simultaneously by the elevation and depression of the guiding handles.

ALARM ATTACHMENT FOR DOOR LOCKS—John Schneider, of Rochester, N. Y. : I claim the employment or use of the barrel, B, hammer, C, with plate, b, attached, spring, D, and tumbler, E, when arranged as shown and for the purpose as set forth.

[This is a useful attachment for door locks, but cannot be properly explained without engravings.]

WINDOW SASH SUPPORTER—David Russell, of Drewersburg, Ind. : I do not claim operating the stop fasteners by means of spiral springs, as the same function might be performed either by elliptic springs, or weights and pulleys.

But I claim, first, the curved form of the stop fasteners constructed in the manner and for the purpose as described.

Second I claim the off-set, f, in combination with the fasteners for accomplishment of the object, as described.

MAKING PAPER BAGS AND ENVELOPES—John A. Smith, of Clinton, Mass., and S. E. Pettee, of Foxborough, Mass. : We do not claim the exact form or arrangement of any of the parts, but only the following points.

First, we claim the bar, K, to relieve the end of the under sheet of the weight of the pile, partially or wholly.

Second, the friction bar, I, to separate the under sheet.

Third, the guide bar, L, in connection with bar I, to hold the sheet in place for the jaws.

Fourth, the lifter, M, to relieve the sheet from the weight of the pile.

Fifth, the feeding from the bottom of the pile.

Sixth, the combination of the weight bar, friction bar, guide bar, and lifter, constituting a feeding apparatus.

Seventh, the jaws to place the paper in position.

Eighth, the former, A, to fold the paper over or around.

Ninth, the pasters and folders.

Tenth, the combination of the table, the bar, B, the side folders, and pasters, all constructed as set forth, or any other substantially the same.

BENCH PLANE STOCK—G. E. Davis, of Lowell, Mass. : I claim the metal plane stock's having a formation of a lip, I, in the back part of its throat, so as to fill the recess which would other wise be below the level of the cutting irons so as to present a continuous smooth surface to the plane, excepting the edge of the cutting irons, and throat forward of them, for the outward passage of the shavings, essentially in the manner and for the purposes set forth.

ALLOYS FOR JOURNAL BOXES—Thomas Firth, of Cincinnati, Ohio : I claim a composition of matter; of copper and zinc, in the proportions of seven and one half parts of copper, to ninety two and a half parts of zinc, or any other mixture substantially the same, and which will produce the intended effect.

SAWING OFF PILES UNDER WATER—James Fleming, of Portsmouth, Va. : I claim the combination of a circular saw and its shaft, carried in movable arms upon and around a stationary shaft, which sustains the driving pulleys, and which is fixed to an adjustable tongs or clamp, substantially as described, for the purpose of cutting or sawing off piles under water.

I also claim the method of fastening to the pile to be sawn by means of a clamp or adjustable tongs, with suitable jaws and teeth, as described.

I further claim the method of feeding a circular saw from points of resistance fixed upon a stationary shaft, by means of arms, curved racks, and pinions, as set forth.

FARM GATES—C. L. Harson and M. R. Brailey, of Norwalk, Ohio : We claim the construction of farm gates with their several parts loosely connected, combined with the bent lever, L, and diagonal rod, R, arranged and operating so as to elevate the gate in opening, for the passage of obstructions, substantially as set forth.

GANG PLOWS—T. J. Hall, of Tawakana Hills, Texas : I do not claim a gang of plows; nor do I claim the hanging of the plows to hinged or pivoted beams, these being well known.

But I claim the arrangement of the plows and pivoted beams, with the adjustable cross beams, so that the plows have a convenient permanent adjustment, in connection with their self-adjusting property in the plow beam, as set forth and described.

SPRING ROLLERS FOR CURTAINS—John and Jacob Hartshorn, of Boston, Mass. : We claim attaching one end of the springs to the sliding block, K K', for the purpose of enabling them to increase and diminish in length as they are wound up or expanded, in the manner and for the purpose set forth.

BOOT AND SHOE STRETCHERS—Warren Holden, of Philadelphia, Pa. : I claim dividing the last, A, into a number of parts, a b c c, connected by rods, e e f f, and a link, d, and forcing said parts outwards, so as to stretch the boot or shoe at any desired part, or at all parts, by means of the device composed of the jointed levers, j j, nuts, k k, and rod, l, as shown and described.

[For boot and shoemakers and fitters, this seems to be an important improvement; it is far superior to any of the stretchers for a like purpose we have seen. A brief description of its peculiarities may be found in this week's paper, on another page.]

BOOT CRIMPING MACHINES—H. B. Horton, of Northville, Mich. : I claim the adjustable wires, b b, (made so by set screws, d d,) on the face of the jaws, B B, arranged substantially in the manner and for the purpose set forth.

PROJECTILE FOR FIRE ARMS—Eben Hoyt, of Chelsea, Mass. : I claim the employment of inclined surfaces, upon the rear end of the ball, operating in the manner and for the purpose substantially as set forth.

MITER BOX—Matthew Spear, of Bowdoinham, Maine : I claim the additional improvement made by me, viz., the sliding index arch, A, as combined with the lumber bearers or supporters, a a', and the saw guide, and made to operate therewith, essentially as specified.

I also claim the combination of the extra grooves, f2, with the lumber supporters, the same being for the purpose as set forth.

I also claim the combination of the grooves, e2, and said lumber supporters, such being for the purpose as set forth.

I also claim the combination of the adjustable gauge with the edge supporter, the same being to determine the length of the stuff to be operated upon.

I claim also the described mode of constructing the head, k2, of the adjustable gauge so that it may serve to increase the bearing for the stuff during the operation of mitering the supplement of an angle, as described.

I also claim the movable edge pieces, K K, in combination with the lumber bearers.

I also claim combining with the curved arc, A, the inner index scale, for the purpose of enabling a person to adjust the machine for the purpose of mitering to the supplement of any angle required, as specified.

And I also claim combining with the movable pieces, K K, the projecting lips, a' a' the same being for the purpose specified.

CLAMPING SASH, &C.—S. P. Smith, of Half Moon, N. Y. : I do not claim separately the adjustable heads, B B. Neither do I claim operating the clamps, D, by a toggle joint, irrespective of their connection with the adjustable head and the arrangement shown.

But I claim the employment or use of the clamps, D D D D, operated by levers, e' e'', connected to a head, F, and forming what is commonly termed a toggle joint, in combination with the adjustable heads, B B, the above parts being arranged and operating in the manner and for the purpose, as shown and described.

[This invention was beautifully illustrated in No. 7, present Vol. of the SCI. AM.]

SEWING MACHINES—G. W. Stedman, of Vienna, N. J. : I claim feeding the cloth or other material, along, by means of a pin, a, or its equivalent, playing in a revolving shaft, B, which at the proper moment in each revolution brings it in contact with a stationary cam, M, or its equivalent, whereby the pin is pressed into the cloth, but again recedes therefrom, as soon as freed from the cam, substantially as set forth.

I also claim the cam, M, constructed substantially as described, when arranged upon a movable arm or its equivalent, so that by simply adjusting its position, the length of stitch can be varied at the will of the operator.

MACHINES FOR BURNISHING METALS—Jeremiah Stever, of Bristol, Conn. : I claim the arrangement of the connecting rod, I, of the burnishing slider, B, the rocker shaft, E, the slider, H, the rod, G, and the bow or stirrup, F, whereby the movement of the burnishers may not only be entirely arrested, while the rocker shaft is in motion, but may have given to it such an extent of reciprocating movement as occasion may require.

FURNACES FOR HEATING WROUGHT-IRON WHEELS FOR FORGING—W. R. Thompson, of Cleveland, Ohio : I claim the arrangement of the furnace, A, with double fire places or chambers, D D', furnished with flues, G G', and dampers, F F', in combination with the wind pipe, I, and valves, J J', for the purpose of alternately heating both sides of the hubs of wrought iron wheels or other articles, between the nozzles, h h, in the manner specified.

[NOTE—Of the above brief list of patents issued last week FOURTEEN of them—more than one-third,—were secured through the Scientific American Patent Agency. We believe there was never a greater demand for good patents than there is at the present time, and parties who are contemplating securing their inventions, should not delay to take the necessary steps. It is our opinion that a better time for taking patents in this country will never arrive, and that a greater demand will never be made for good improvements than now exists. Circulars of information concerning the proper steps to be taken to secure patents, furnished *gratis* upon application to this office. They are also sent by mail when requested.

Singular Phenomenon.

Just above the locks on Green River, Indiana, when there is a low stage of water, the steamboats shut down their furnace doors for fear of "setting fire to the river," the bottom of which is covered to a great depth with decomposed vegetable matter, which, when stirred up by the paddles, emits an inflammable gas, instantly igniting in contact with flame. By stopping the boat the flame ceases, and is seldom dangerous.—[Exchange.

Horticultural Novelty.

The agricultural branch of the Patent Office has taken steps to procure seeds of the bunya-bunya, a tree of the fir genus, which grows in Australia, and bears a cone nearly two feet in diameter, filled with seed of the size of an olive, and of flavor more rich and delicate than that of the pine apple.

There have recently been imported from France the cuttings of several varieties of the prune, which have been distributed by the Department in Maine, New Hampshire, Vermont, Northern New York, Michigan, Wisconsin, Minnesota, and several points on the Allegheny mountains, to be engrafted on the common plum tree.

The Patent Eight-wheeled Car Case

A very important patent case, which had occupied the U. S. Circuit Court in this City, Judge Betts presiding, from the 5th of last March, (no less than sixty days,) was concluded on Friday the 4th inst.

It was a trial for infringement of the patent of Ross Winans, of Baltimore, by the Harlem Railroad Company. The patent was obtained in 1834, for the employment of eight-wheeled cars on railroads, and the present suit for damages was instituted in 1849. The defendants pleaded the general issue, viz., that the invention was not new, that eight-wheeled cars had been employed for similar purposes before Ross Winans' application of them, and even if he were the original inventor, he had allowed them to go into public use, with his consent, before his patent was granted, and that under the act of 1793 (now abolished by the act of 1836, subsequent to the granting of his patent,) it constituted abandonment of the invention. It was also contended that the patent drawings substituted by him for those burned in the Patent Office, in 1836, were not true copies.

Judge Betts charged the Jury, that the drawings substituted for those burned must be like the originals, and they were to judge of this from the evidence. Also whether the cars used for the transporting of lumber, and those patented in England, before 1834, presented as proof by the defence, were similar to those of the complainant; also, whether he constructed cars, and allowed them to be publicly used, for the benefit of other parties before he obtained his patent. If the invention of Mr. Winans were new, unlike those used before 1834; if he did not dedicate it to public use; and if his drawings, were true copies of the originals, and correct, then he was entitled to the verdict.

The Jury were out all night, and came in on the Friday morning requesting further instructions from the Judge; these were given, and they again retired for a few hours, when they came in and declared they were unable to agree. They were then discharged.

Such were the *inconclusive* results of this long trial, said to cost $40,000. A deep interest was manifested respecting what the decision of the Jury would be. It may be said that many millions of dollars vibrated on the issue, claims having been set up against a number of other railroads for infringement of the same patent.

Ketchum's Patent Case.

Howard & Co., of Buffalo, have published in the Buffalo *Advertiser* of the 24th ult., the decree and injunction granted by Judges Nelson and Hall, in Utica, on the 18th ult., against E. Forbush and W. Mercer. They assert that all those who are using the machines made by the American Mowing Machine Co.—Forbush's patent—is liable to them for damages.

Reaper Patent Case.

In this city on the 28th ult., before Justice Nelson, U. S. Circuit Court, three cases for infringement of McCormick's reaper patent were decided. One of the defendants—Wood—agreed to take license from McCormick; but injunctions were granted against the other two, Marcellus and Jerome.

When we went to press, another case of McCormick, against Seymour, for infringement of his reaper patent, on a motion for injunction, was being argued before Judge Nelson.

A suit between Woodworth and Norcross, respecting Woodworth's planing machine, is also set down for trial. The results we will present to our readers in due season.

The Ohio *Cultivator* gives accounts from several counties of that State respecting the promising appearance of the young wheat crop.

TO CORRESPONDENTS.

W. P., of N. Y.—You are a plain sensible farmer, and ask sensible questions. You remark correctly that some who write on agricultural subjects show remarkable ignorance by dealing in indefinite technicalities. You ask about manures—our opinion about the best kind. Our advice is, that every farmer, should be able to make as much for himself, in his own barn yard, as will keep his farm in proper condition. Barn-yard manures, taking care to save the liquid part, is the cheapest kind. With a rotation of crops, summer fallowing, the use of lime, and a proper stock of animals, no farmer need expend much in purchasing artificial manures.

E. C., of C. W.—You must introduce every new and improved agricultural machine and implement into Canada, that we have here. Never buy a machine for your own use unless it is well made and of good materials. Erect a small workshop, get a chest of tools, and be sure and have a large tool-house to keep your plows, harrows, &c., under cover, when they are not required for use. Don't let the iron of any tool rust, for every ounce of rust is a loss of five dollars.

H. W. B., of Ohio—We cannot tell you whether there is, or is not a single factory for making fine linen fabric in our country

E. McC., of Va.—Tobacco is now cultivated in many places in New York State; so far as we have been able to learn it is not equal in quality to that of Virginia; however, we cannot tell you if this is correct.

R. S., of Phil.—The prussiate of potash, pounded and made into a paste, with water, is now employed for case-hardening, in place of old boot legs, horns, and hoofs, which were formerly used by tool makers for this purpose.

J. J. W., of N. Y.—It requires but a very limited amount of information to say that such and such is incorrect. When you do so, always be ready with proof to substantiate your opinions.

C. S. W., of Wis.—The water is the power which propels a water wheel; in its own self, the wheel cannot be said to possess any power. The velocity of the water in feet per second, and the quantity which falls in a minute, in pounds, multiplied into one another, and divided by the constant quantity, 33,000, will give you the horse-power of the water. A dynamometer will give the effective power of the wheel.

C. D., of Ohio—It will require more water to condense steam by outside or surface condensation than injection.—If you use about five and a half times the quantity of surface of your cylinder, you should obtain a good vacuum.

T. A. W., of N. Y.—The Office require that caveats shall be sworn to as well as applications for patents.

L. E. W., of Vt.—A *self-acting* pump, whether located in a barn yard or a parlor, must be, strictly speaking, new. If you don't mean what you say, and refer to a pump made to act by the pressure of the animal when it drinks, the idea is not new.

D. V. M., of Ill.—Your supposition is correct. Subscribers to the SCIENTIFIC AMERICAN can have reasonable questions answered by mail or in the columns of the paper gratis. Your sketch shall be examined, and advice given, on its receipt.

O. S., of La.—You can manufacture and sell your filters with safety, whether you get a patent or not, but we shall try hard yet to get a patent for you. Your letter covering $10 was answered by mail.

J. V. C., of Vt.—Your plan of providing the bore of rifles with projecting ribs, and grooving the ball to fit the ribs, or of making the ribs serve as guides to the ball, is not new. It has been presented to us several times. We have no account of its ever being proved equal to the grooved barrel. $1 received, all right.

W. R., of Ohio—Placing the working parts of a gun lock outside, instead of imbedding the lock in the gun stock, must, in the alteration of old fire arms be a useful improvement. But it is not patentable, and therefore we cannot advise you to go to any expense in the matter.

J. C., of Tenn.—We have received your last communication on perpetual motion.

P. S., of N. Y.—When you write again, be sure and use a pen, and make your letters clear and distinct, and beware of being long-winded.

H. H. L., of Pa.—The pressure upon each square foot of surface at the center of the earth—calculating the weight of the superincumbent strata—would be 1,492,000×5,280 lbs.—Air submitted to this pressure would produce a most intense heat.

D. R. K., of Pa.—Your suggestion in regard to an improved mode of confining animals within a proscribed range in fields is not new. It is common to attach a rope or chain to a wire or rod, loosely, so that the animal may come from one end to the other, and still be secured by the rope to within a specified distance of the rod. Have you never seen monkeys so tied in a menagerie? the principle is essentially the same, and being old, is not patentable.

J. H. H., of Pa.—The model of Mr. Lindsey's shaker was forwarded to him by Adams & Co's express, on the 5th. We are happy to hear that your Institution is so flourishing. We trust you will have a good exhibition in the mechanical department. A few weeks before the opening remind us of the Exhibition, and we will direct attention to it in our columns.

R. McC., of Tex—Don't be afraid, for until you make wiser suggestions you need not fear of our republishing them over your signature, or even without any name.

M. N., of Pa—We are much pleased with your improvement in lathes; we think it is patentable. Your first step will be to send a model, with the Government fee of $30, to this office.

W. H. K., of Conn.—Your plan for making the looms steam conductors for heating, will involve their being set on an incline, for the purpose of allowing the condensed steam, to run down into a receptacle. Otherwise your plan is feasible and good, and a patent may be obtained for it. Every inventor has a full and exclusive right to his own inventions. There are thousands of inventors who have deeply regretted not patenting their inventions in season, —others stepped in before them, and received profitable patents.

G. H. C., of N. J.—Your distance indicator for carriages, is not new. Your idea of going around to work in the principal machine shops of the country, to engage in and witness the present methods of constructing steam engines, will be serviceable to you personally, and perhaps enable you to produce a useful work.

Somebody, writing from Chicopee Falls, Mass., has sent us a description of an excellent device of a perspective drawing instrument, but the letter came without signature.

F. B., of N. Y.—For information about the Daguerreotype, address Mr. Mascher. The suit against Trinity Church is not yet ended.

C. W. & J. L., of Mo.—You ask if there is a suction fan patented: we do not understand what you mean.

T. D., of Ala.—We do not think your plan for a steam boiler possesses patentable novelty; corrugated iron has been used in almost every variety of form for a like purpose, with the size of corrugations varied almost indefinitely.

E. M. S., of N. Y.—We know of no patent on any substance for making eylets for any purpose.

C. L., Jr., of Ct.—A sash catch operating substantially like yours, has been long in use. The objection to them is, that too much of the frame has to be cut away. Your plan is not patentable.

H. W., of Mass.—The pianoforte business is very dull in this city, at present; the prices for piece-work in some branches have been reduced.

R. C. J., of Conn.—You are perfectly right in your views regarding the great amount of bad joiner work now performed in our country: quantity not quality, appears to be the grand aim. Apprentices are too impatient to do a big day's work. A good joiner is a rarity among our carpenters.

C. D. H., of Pa.—On page 161, Vol. 3, of the SCIENTIFIC AMERICAN, you will see an engraving of a street-sweeping machine, which we judge from your description is essentially the same as your plan. Examine that engraving and see if we are not correct.

D. F., of La.—Ball valves have been used in pumps a number of years—as long ago as 1848, an engraving was published in our columns of a pump having "ball valves," and they were in use long before that.

J. R. A., of N. Y.—In order to get up engravings of you fire engine, we should require the letters patent. It would be three or four weeks after their receipt before we could get the engravings in the paper. The expense would be $15. We are glad you are so well pleased at the success of your agents.

Samuel Neff, of Newmarket, Va.—Wishes to purchase the best butter worker in use. One capable of working 100 lbs. at a time. Who can furnish him? Address the enquirer, not us.

P. H. W., of N. Y.—For the fine list of subscribers you sent us accept our thanks. Considering the time of year, when every body is busy, or should be, we think you have done remarkable well in getting so good a list. The diagram of your spoke machine shows the most simple constructed machine for the purpose we have ever seen. It is difficult determining whether a patent would probably issue or not, so many have been the cases applied for, still we think yours is different from any we have seen, and we think, if it will operate, it is a capital invention. Send us a model, and we can give you better advice as to its patentability, we have not much doubt but what it is patentable, however, from your description and sketch.

The following French patents, which came out by the *Atlantic*, last Friday, remain uncalled for, and are subject to the order of the owners:—J. C. Howe, improvement in Fire Arms; H. Berdan, improvement in Life Boats; Daniel Noyes, improvement in Wrought Nail Machinery.

Money received at the SCIENTIFIC AMERICAN Office on account of Patent Office business for the week ending Saturday, May 5:—

B. B. B., of Tenn., $25; E. D. C., of N. Y., $25; A. H., of N. Y., $30; E. R. N., of Pa., $25; B. & R., of Mass., $35; A. L., of Pa., $30; J. P., of Mass., $55; J. B., of N. Y., $32; H. B., of Ct., $250; H. W., of N. Y., $30; T. McC., of Ala., $25; J. H., of Wis., $25; G. W. M., of Mich., $25; E. D. W., of Pa., $30; P. & S., of O., $55; J. C. D., of N. J., $130; W. S. F., of N. Y., $10; R. d'H., of N. Y., $10; J. B., of Ct., $55; J. E. B., of L. I., $25; A. & G., of Ind., $30; A. C., of N. Y., $55; A. & C. N. C., of N. Y., $30; A. B. H., of Pa., $30; C. D. W., of Wis., $30; J. R. H., of Pa., $35; J. E. C., of N. Y., $30; W. F., second, of Mich., $20; W. C., of N. J., $30; L. M., of Wis., $10; S. H., of Ill., $20; W. H. B., of Pa., $30; J. B. L., of N. Y., $30; H. T. R., of Mass., $35; V. P. C., of N. Y., $250; L. M., of O., $30; A. S., of Mich., $5; B. R., of Va., $30; J. L. G., of Ky., $55; W. A. S., of Mass., $50; F. C. L., of Pa., $25; R. K., of N. Y., $25; H. R., of C. W. $55.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, May 5:—

B. & R., of Mass.; W. D., Jr., of Pa.; J. B., of Ct.; A. S., of Mich.; B. B. B., of Tenn.; A. H., of N. Y.; E. D. C., of N. Y.; E. R. N., of Pa.; F. C. L., of Pa.; R. K., of N. Y.; T. McC., of Ala.; G. A. M., of N. Y.; G. W. M., of Mich.; S. R., of La.; J. A., of N. J.; J. H., of Wis.; J. P., of Mass.; H. R., of C. W.; P. J. C., of S. C.

Important Items.

PATENT LAWS, AND GUIDE TO INVENTORS—Congress having adjourned without enacting any new laws pertaining to applications for patents, we have issued a new edition of the old laws, which may be had at our counter or sent by mail. This pamphlet contains not only the laws but all information touching the rules and regulations of the Patent Office Price 12½ cents per copy.

PATENT CLAIMS—Persons desiring the claim of any invention which has been patented within fourteen years, can obtain a copy by addressing a letter to this office, stating the name of the patentee, and enclosing $1 for fees for copying.

MODELS—We are receiving almost daily, models of inventions which have not the names of their inventors marked upon them. This usually prevents us from taking any notice of them whatever. We shall esteem it a great favor if inventors will always attach their names to such models as they send us. It will save us much trouble, and sometimes prevent the model from being mislaid.

UNITED STATES PATENT OFFICE,
Washington, April 33, 1855.

ON THE PETITION of Hiram Dillaway, of Sandwich, Mass., praying for the extension of a patent granted to him on the 21st Aug., 1841, for an improvement in the construction of molds for pressing glass, for seven years from the expiration of said patent, which takes place on the 21st day of August, 1855—

It is ordered that the said petition be heard at the Patent Office, on Monday, the 6th of August next, at 12 o'clock, M.; and all persons are notified to appear and show cause, if any they have, why said petition ought not to be granted.

Persons opposing the extension are required to file in the Patent Office their objections, specially set forth in writing, at least twenty days before the day of hearing; all testimony filed by either party to be used at the said hearing must be taken and transmitted in accordance with the rules of the office, which will be furnished on application.

The testimony in the case will be closed on the 26th of July: depositions, and other papers relied upon as testimony, must be filed in the office on or before the morning of that day; the arguments, if any, within ten days thereafter.

Ordered, also, that this notice be published in the Union, Intelligencer, and Evening Star, Washington, D. C.; Daily Republican, Baltimore; Pennsylvanian, Philadelphia, Pa.; Scientific American, New York, and Post, Boston, Mass., once a week for three successive weeks previous to the 6th day of August next, the day of hearing.

S. T. SHUGERT,
Acting Commissioner of Patents.

P. S.—Editors of the above papers will please copy and send their bills to the Patent Office, with a paper containing this notice. 35 3

Science and Art.

The Earth that we Walk on.

It may surprise some readers to learn that all the earths—clay, flint, chalk, &c., are nothing more than the rust of metals; that at one time, during the age of this world, they were all shining brilliant metals. Geologists speak of the earth as being hundreds of thousands of years old. All their philosophy is based upon mechanical science; the formation of strata, the upheaving of mountains, the burying of forests, have been attributed to some "great convulsion"—that is, to some shaking together of the earth's crust. Whether this great age of the world be true or not, it is very certain that before any of these events could have taken place, the formation of each of the earths must have been the work of ages; otherwise the metals of which their base consists could not have been so completely rusted as to assume an earthy texture. To understand this we must leave the mechanical, *i. e.*, the geological theory, and enter upon the primary or chemical theory. It cannot be disputed that the first changes of the earth's surface were of purely a chemical nature. Combinations took place then as now; the metallic bases, by mere contact with the atmosphere or water passed into oxyds, as the chemist calls them, or earths, as expressed in daily conversation. Chemists thus recognize something like 40 different kinds of these oxyds or earthy bodies, some being very scarce, and others as plentiful. By the merest touch of air some of the metallic bases of these earths instantly pass into the rusty or earthy state; some by contact with water are so energetic that they burst into flame. By this process of reasoning we come to the conclusion that the world is one mass or globe of mixed metals, of which the mere crust has become rusted, or of earthy form; the outer rind, as it were, preventing any rapid combination taking place with the metallic surface, five or six miles below the face of the dry land. Eruptions from volcanoes are probably produced by the sea getting down to the metallic surface through some fissure in the earth's crust; decomposition of the water then takes place; fire, flame, and steam causing an eruption. It would be an instructive lesson to man to quarry into the earth's crust the depth of ten or twelve miles.

SEPTIMUS PIESSE.

London.

Benzole.

This liquid carbo hydrogen, so valuable as an economical solvent of india rubber, gutta percha, resins, and other difficulty soluble substances, is readily prepared by Mansfield's process.

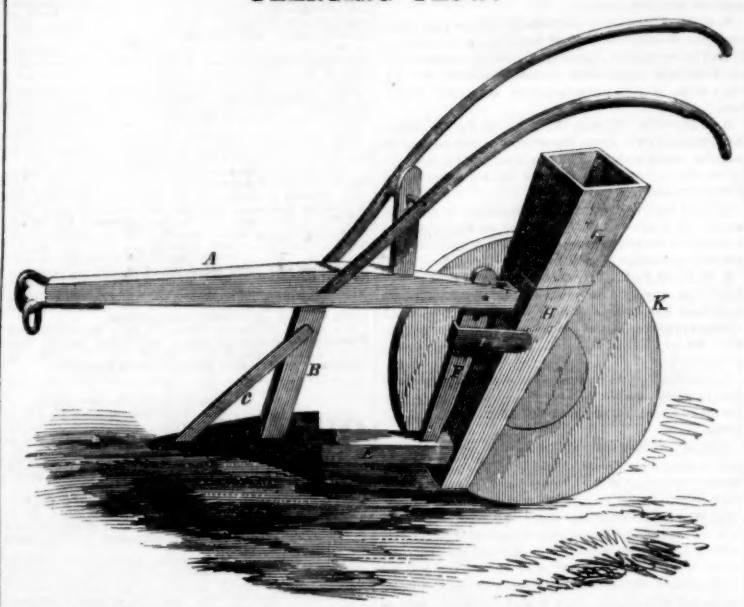
The light coal naphtha, obtained in the early stage of the distillation of coal-tar, is distilled in a metal retort having its head surmounted with a chamber containing cold water, so that the liquids less volatile than water may be condensed and fall back into the retort or into a separate receiver, while those more ethereal pass on in vapor to a condensing vessel kept cool with water or ice. The liquid ceases to pass as soon as the water in the chamber commences to boil, because all vapor volatile below 212° has then been driven over into the condenser. The distillate is rectified by a second distillation, as above, taking care this time, that the temperature of the water surrounding the head of the still shall not quite reach 176° Fah., that being the boiling point of benzole. The distillate obtained before the temperature within the retort has risen to 194°, is a yellowish volatile oil, which at 4°, drops one half of its bulk in crystals.

This liquor, by agitation with one-tenth its volume of strong nitric acid for the removal of the oxydable substances, and, subsequently, after separation from the acid, with one-fourth its volume of oil of vitriol, to separate neutral oils, basic, and coloring matters, is prepared for the last distillation. All the distillate obtained below 194° is to be reserved and washed with water, and finally with an alkaline solution. The purification is completed by congealing it at 4° Fah., and pressing out the solid portion, filtering and drying by means of chloride of lime.

The volatility of benzole imparts great value to it as the solvent of resins for forming varnishes, or artificial cuticles in dressing wounds and burns. Those resins, as copal, &c., which do not dissolve in the liquid, yield readily to the vapor.

Air or coal gas, surcharged with benzole, yields a flame of highly luminous power. So also, when mixed in the proportion of one volume to two of alcohol or pyroxylic spirit of .840, it forms an admirable burning fluid. It moreover possesses anæsthetic properties.

PLANTING PLOW.



The annexed engraving represents a planting plow, for which a patent was granted to B. M. Snell, on the 20th of March last.

The nature of the improvement consists in so constructing a planting plow by combining a plow, resembling a subsoil one, with a seed dropping apparatus, operated by the wheel of the plow, for the purpose of depositing the seed under the surface in the soft and prepared bed.

A is the beam, from which descends the stock or coulter post, B. *c* is the coulter; the share is secured on the post, B; E is a bar extending from the rear of the share and united to an upright, F, whose upper end passes through the rear of the beam. This upright is furnished with holes and a pin, by which the plow is made to plant deep or shallow as required.

The seeding apparatus consists of a hopper, G, and dropping tube, H, secured by a strap, I, to the upright, F, and to the end of the beam. This hopper has a sliding bottom and hole therein, which, when the slide is forced in, an opening is made for the passage of the seed into the tube. On the back of the hopper and dropping tube is secured the axis of a pair of wheels, *k*, (one shown,) one of which is furnished with a cam or angular striker hat forces in the slide of the hopper on each rotation of the wheel.

The object of this improvement is to create a soft bed for the reception of the seed in the earth without the disadvantage attending the open furrow made when the soil is thrown out, and the seed frequently deposited on a hard soil or bed, and of course disadvantageously to its growth; also to obviate a difficulty in planting corn on a hill side, wherein the open furrow made is liable to create a wash of the land in heavy rains, occurring soon after planting, which frequently renders re-planting necessary, besides the loss of soil where most needed. By this improvement all the properties of a light bed and retention of the fertilizing property of the manure is obtained, particularly where such as guano or other volatile article is used, as it is not thrown to the surface, as would be the case if the ordinary tine or small mold board planter were used.

More information may be obtained by letter addressed to S. Oliver, Agent, Hancock, Maryland.

Artificial Mineral Manures.

Liebig gives the following proportions of salts as the basis for manures. 1. 2½ pts. carbonate of lime and 1 pt. potash (or 1 pt. of a mixture of potash and soda.) The potash usually contains 60 per cent. carbonate, 10 per cent. sulphate, 10 muriate, and some silicate of potassa. 2. Equal parts of phosphate of lime, potash, and soda. The above mixtures are each fused separately in a reverberatory. According to the peculiar wants of the soil, the proportions given may be varied, and also different substances added, such as plaster, bones, silicated alkali, ammonia, phosphate of magnesia. According to Stenhouse, the calcareous phosphate may be obtained from urine, as well as from guano and bones, by adding milk of lime, drawing off the liquid from the deposit, and drying the latter. 100 lbs. urine yield nearly ½ lb. of the precipitate, which when dry contains 2-5 phosphoric acid, 2-5 lime, &c., and 1-7 nitrogenous organic matter.

ACID PHOSPHATE OF LIME—It is some years since this salt was proposed as a manure, and repeated trials since that time have fully demonstrated its efficiency. The simplest method of preparing it is as follows: Bones are thrown into heaps, where they soften by fermentation. They are then covered with half their weight of water in wood or stone vats, and half their weight of oil of vitriol added. The whole passes into a pasty state in the course of eight or ten days, when it is mixed with earth, charcoal, or sawdust, to render it pulverulent. If it be required to apply the salt in a fluid state to land, the paste is diluted with 100-200 times its bulk of water.

How Our Bodies are Made up.

Eating is the process by which the noblest of terrestrial fabrics is constantly repaired. All our limbs and organs have been picked up from our plates. We have been served up at table many times over. Every individual is literally a mass of vivified viands; he is an epitome of innumerable meals. Liebig states that an adult pig weighing one hundred and twenty pounds, will consume five thousand one hundred and ten pounds of potatoes in the course of a year, and yet at the expiration of that period its weight may not have increased a single ounce.

Eyes and Cold Water.

The aquatic furor has become so general, that for the simple reason that cold water is a pure, natural product, it is claimed to be a universal and beneficial application. Arsenic is a pure, natural and simple product; so is prussic acid, as obtained from a peach kernel. A single drop of tobacco oil will kill a cat or dog in five minutes.

Many persons are daily ruining their eyes by opening them in cold water of mornings. Cold water will harden and roughen the hands, and much more will it do so to the manifold more delicate covering of the eye; or the eye will, in self-defence, become scaly in the manner of a fish; that is, the coats of the eye will thicken, constituting a species of cataract, which must impair the sight. That water, cold and harsh as it is, should be applied to the eye for curative purposes, in place of that soft, warm, lubricating fluid which nature manufactures just for such purposes, indicates great thoughtlessness or great mental obliquity.

[The above, from *Hall's Journal of Health*, contains good advice.

Fresnal Light in California.

A Fresnal light has been erected on a point at the entrance of the San Francisco Bay. It is 52 feet above the level of the sea.

German Silver.

German silver spoons of a yellow color contain copper and arsenic, and should never be used. Pure German silver is white.

Importing Eggs.

A thousand dozen hens' eggs were recently imported into this city from Havre, France. This is rather a disgrace to our poultry-mania people.

LITERARY NOTICES.

THE KNICKERBOCKER—"Old Knick" comes to us this month fresh and blooming with poetry and prose. The first article is entitled "My Campaign Reminiscences,"—a tale of the Mexican war, and is full of thrilling incidents from beginning to end. The Editor's Table, as usual, is full of sparkling wit—the nectar of cheerfulness.

GAZETTEER OF THE WORLD.—We have received from Lippincott, Grambo & Co., Philadelphia, a specimen number of the new Complete Pronouncing Gazetteer of the World. It will contain notices and the pronunciation of names of near one hundred thousand places, and will be the most complete volume of this description ever published. It will consist of over 2000 super royal pages, with a steel plate map of the world.

COACHMAKER'S ILLUSTRATED MAGAZINE—The May number of the above named magazine contains two lithographic plates, embracing five figures,—a Rockaway, a Jersey Wagon; a Trotting Buggy; a Boston Chaise, and a light Rockaway,—besides a number of wood-cuts explaining branches of carriage making. It is an excellent number, and contains a great variety of useful information. C. W. Saladee, editor and proprietor, Columbus, Ohio.